



JRC SCIENTIFIC AND POLICY REPORTS

# Scientific, Technical and Economic Committee for Fisheries (STECF)

## Management plans part 2 - changes to cod plans (STECF-12-13)

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This report was reviewed by the STECF during its' 40th plenary meeting  
held from 9 to 13 July 2012 in Copenhagen, Denmark

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## **SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (STECF)**

### **Management plans part 2 - changes to cod management plans (STECF-12-13)**

#### **THIS REPORT WAS REVIEWED DURING THE PLENARY MEETING HELD IN COPENHAGEN, DENMARK, 9-13 JULY 2012**

#### **Background**

Next to preparing for the development of multi-stock plans, the Commission is considering proposing possible improvements of the cod plan<sup>1</sup> with regards to the implementation problems identified by STECF<sup>2</sup>.

STECF is therefore requested to advice on possible options for amending the cod plan built on the advice already provided in the spring plenary report<sup>3</sup>.

#### **Request to the STECF**

STECF is requested to review the reports of the STECF Expert Working Group (EWG-12-07), evaluate the findings and make any appropriate comments and recommendations.

#### **STECF observations and conclusions**

STECF has reviewed the report and makes the following observations and conclusions for the headings below.

#### **Review of proposed changes of the current cod plan**

Previous to the meeting the Commission provided the working group with proposed changes to article 9, 11, 12 and 14 of the current cod plan (EG) 1224/2008.

#### *Article 9*

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<sup>1</sup>Council Regulation (EC) No 1342/2008 establishing a long-term plan for cod stocks and the fisheries exploiting those stocks

<sup>2</sup> EWG report on the "Evaluation of multi-annual plans for cod in Irish Sea, Kattegat, North Sea, and West of Scotland (STECF-11-07)"

<sup>3</sup> 39th Plenary meeting report of the Scientific, Technical and Economic Committee for Fisheries (PLEN-12-01), 16-20 April 2012

STECF notes the need for alternative advice if assessments are not available. Methods for Kattegat cod and Irish Sea cod are provided by the working group.

### *Article 11*

- STECF supports the removal of derogations merely based on catch compositions as they could occur because of cod depletion.
- STECF supports the recommendation to approve exemptions for fishing activity outside the distribution area of cod and/or fishing with gear that minimizes cod catches.
- STECF considered that using the percentage of cod in the total catch as an exemption criterion is flawed, because even when percentages of cod in the catch are low, these catches can still contribute significantly to overall cod mortality if overall catch or effort is high or when cod abundance is low. STECF notes that table 6.1 of EWG 12-XY provides a clear overview of the pros and cons of different options of replacing the 1.5 % exemption criterion in the current regulation.
- STECF considers that it might be useful for STECF to evaluate, on a case-by-case basis, practices other than gear- and area based measures demonstrating actual decoupling.
- STECF notes that the proposed amendment does not include any requirement for monitoring whether the catches in the exempted areas and by the exempted gear remain low. STECF recommends that a requirement for periodical monitoring be added such that it can be verified whether the levels of cod catches of exempted vessels still conform to the criteria for entering the exemption and whether these levels do not oppose the plan's aim to reduce mortality on cod.
- STECF notes that the enforcement and implementation of the proposed Article 11a1(a) concerning a depth requirements could be problematic due to position reporting requirements and considers that exempted vessels could be required to report exact position, depth, and duration of each haul in logbooks to the control authorities. Intervals between VMS transmissions should also be increased to at least 30 minutes. To provide verification MS should submit raw data on logbook, depth, and VMS from the entire fishing trip. STECF notes that adding these requirements will result in additional control costs by adding another layer and additional data to the administrative control. The fishing industry would also increase their cost in transmitting VMS data. STECF recommends that the full costs of introducing these measures and their associated benefits are fully explored before amending the regulation.
- STECF notes that the enforcement and implementation of the proposed Article 11a1(b) concerning gear requirements could be problematic due to the requirement to specify in detail how the gear is to be used. Moreover, in common with all gear-based regulation, it is difficult to define accurately in an effective way, and it is essential to verify through monitoring effectiveness in practice. Furthermore, although a gear may reduce overall cod catches by XX% it may actually increase cod catches of certain (e.g. young) age classes; selectivity is length-dependent and thus reduction is demography-dependent.

## *Article 12*

In the wording in the proposed change to the cod plan it is not clear what differentiates the conditions for Articles 9.1 and 9.2, upon which Article 12 depends. Discussions with the Commission suggest there is a clear distinction in mind but this is not expressed in the current draft. Perhaps there is a need to clearly define the different levels of scientific advice alluded to in the draft regulation text (i.e. insufficient information to set the TACs).

## *Article 13*

STECF has repeatedly underlined the difficulty for stakeholders to comply with and for STECF to evaluate article 13 requirements stating that cod avoidance measures must be demonstrated to deliver at least as much reduction in fishing mortality than otherwise would result from effort reduction.

Fishing mortality is a fairly abstract concept that the industry cannot monitor and manage directly, and which does not have proportional relationship to catches. The EWG-12-07 report 'changes to cod plans' section 6.5 proposes a method based on catch that could be used instead of the F-based approach to demonstrate conformity with the regulation.

## *Article 14*

The implementation of the new article 14.6 could be problematic. It states that MS shall take immediate measures to minimize discards if the quota allocation does not correspond to the expected catches. There are a number of different measures that can be considered immediate measures and it is important that these do not create perverse incentives. For example, the way the proposal is written it could read that one possible measure could be to reallocate quota towards fisheries with high cod by-catches.

## **Evaluation of a range management approaches from compliance and industry perspective.**

In addition to the ToRs the working group explored the management measures suggested by the STECF (EWG 11-15) from an enforcement and fishermen perspective.

The management options selected as the most favourable for enforcement (catch quota system) is the one least favoured by the fishermen responding to the questionnaire. This difference can be partially explained through the choice of survey instrument. An on-line questionnaire is not the most appropriate approach to gathering feedback on complex management options, as it is difficult to explain the operation of the management option, and not possible to know if the respondent has completely understood all the details. The evidence from the survey suggests that respondents were most concerned about the suggested limit on fishing once one quota had been exhausted. Fishers appear to prefer the current system with landings restrictions which scientist advise will not limit fishing mortality. The results do suggest general support for CCTV and fully documented fisheries.

Inevitably, there are varying and divergent views on appropriate and desired management options given the variety of stakeholders and subgroups existing within the fisheries (e.g., varying fleets within and across MS, enforcers, managers, scientists). The two studies of the enforcement implications and industry views of management options highlight these divergent views clearly. Though the research behind each was preliminary and of a pilot-project standard, the results were indicative of the reality of divergent views held on potential management options. The views of both enforcement agencies and fishers must be taken into account when designing long-term management regimes. Ideally, the control measures should be efficient and reliable as well as easily understood and supported by the fishing industry.

The study results should be seen as very preliminary. STECF notes that in order to conduct a more complete study funding under an ad-hoc contract is not sufficient.

### **STECF recommendations**

STECF has not specific recommendations drawn from this report.



## **REPORT TO THE STECF**

### **EXPERT WORKING GROUP ON Management plans part 2 - changes to cod plans (EWG -12-07)**

**Edinburgh, Scotland, 18-22 June 2012**

This report does not necessarily reflect the view of the STECF and the European Commission and in no way anticipates the Commission's future policy in this area

## **1 EXECUTIVE SUMMARY**

The STECF Expert Working Group (EWG 12-07) on Management plans pt2 developing area based management plans met in Edinburgh, Scotland from 18 to 22 of June 2012. The EWG considered aspects of the organisation of area based management plans, the boundaries between areas, the resources, timetables and biological and economic modelling needs. The report on this aspect is contained in STECF-12-14; this report considers management aspects relating to the revision of management plans.

The EWG considered evaluation of a range of management approaches from compliance and industry perspectives. The studies are preliminary but indicate rather divergent views on the best solutions.

In the review of the proposed changes to the cod plan the following were noted:

Article 9: There is a need for alternative advice if assessments are not available; methods for Kattegat cod and Irish Sea cod are provided.

Article 11: The EWG supports the use of derogations for fisheries that do not catch significant proportions of cod and the removal of derogations that exist only when they occur because of cod depletion. The EWG considered that using the percentage of cod in the total catch as an exemption criterion is flawed, because even when percentages of cod in the catch are low, these catches can still contribute significantly to overall cod mortality if overall catch or effort is high or when cod abundance is low. EWG provides a list of options with pros and cons (Table 6.2). The EWG noted a requirement for periodic monitoring be added to the regulation such that it can be verified whether the levels of cod catches of exempted vessels still conform to the criteria for entering the exemption.

Article 12: The EWG found the proposed amendments are unclear and difficult to follow. It is not clear what differentiates Articles 9.1 and 9.2, upon which Article 12 depends. There are no suggestions or indications in the regulation as to what is meant by “other appropriate measures.” It is possible, under the proposed amendment, that the effort reduction for a stock with very poor data is limited to -15%, while a stock with more information can end up with a -25% effort reduction; this is counter-intuitive.

Article 13: The formulation as it currently stands is difficult to implement because F is difficult to measure. The EWG proposes a method based on catch that could be used instead of the F based approach to demonstrate conformity with the regulation.

Article 14: The implementation of the new Article 14.6 is problematic. A reallocation of quota is difficult in member states where the TAC is limited by relative stability / MS fixed internal allocation. The current draft could be interpreted in a way that quota could be reallocated towards fisheries with high cod bycatches. Fisheries that currently avoid bycatch of cod would need to give quota to fisheries with high bycatches.

## **2 CONCLUSIONS OF THE EXPERT WORKING GROUP**

### **The following were identified in the compliance and industry response to approaches to management**

The option selected as the most favourable for enforcement (catch quotas) is the one least favoured by the fishermen responding to the questionnaire. This difference can be partially explained through the choice of survey instrument. An on-line questionnaire is not the most appropriate approach to gathering feedback on complex management options, as it is difficult to explain the operation of the management option, and not possible to know if the respondent

has completely understood all the details. The evidence from the survey suggests that respondents were most concerned about the suggested limit on fishing once one quota had been exhausted. Fishers appear to prefer the current system with landings restrictions but scientists advise that this will not limit fishing mortality. The results do suggest general support for CCTV and fully documented fisheries.

Inevitably, there are varying and divergent views on appropriate and desired management options given the variety of stakeholders and subgroups existing within the fisheries (e.g., varying fleets within and across MS, enforcers, managers, scientists). The two studies of the enforcement implications and fleet views of management options highlight these divergent views clearly. Though the research behind each was preliminary and of a pilot-project standard, the results were indicative of the reality of divergent views held on potential management options. The views of both enforcement agencies and those operating fishing vessels must be taken into account when designing long-term management regimes. Ideally, the control measures should be efficient and reliable as well as easily understood and supported by the fishing industry.

### **The following issues were identified in the review of the proposed changes to the cod plan:**

#### **Article 9:**

The EWG notes the need for alternative advice if assessments are not available; methods for Kattegat cod and Irish Sea cod are provided.

#### **Article 11:**

EWG supports the use of derogations for fisheries that do not catch significant proportions of cod and supports the removal of derogations that exist only when they occur because of cod depletion.

EWG supports the recommendation to approve exemptions only for fishing activity outside the distribution area of cod and/or fishing with gear that minimizes cod catches.

EWG considers that using the percentage of cod in the total catch as an exemption criterion is flawed, because even when percentages of cod in the catch are low, these catches can still contribute significantly to overall cod mortality if overall catch or effort is high or when cod abundance is low. EWG provides a list of options with pros and cons (Table 6.2).

EWG notes the amendment does not include any requirement for monitoring whether the catches in the exempted areas, and by the exempted gear, remain low. STECF recommends that a requirement for periodical monitoring be added such that it can be verified whether the levels of cod catches of exempted vessels still conform to the criteria for entering the exemption.

EWG notes that the enforcement and implementation of the proposed Article 11a1(a) could be problematic due to position reporting requirements and considers that: Exempted vessels could be required to report exact position, depth, and duration of each haul in logbooks, VMS transmissions should be increased to every 30 minutes. To provide verification MS should submit raw data on logbook, depth, and VMS from the entire fishing trip.

#### **Article 12:**

The EWG found the proposed amendments are unclear and difficult to follow. It is not clear what differentiates Articles 9.1 and 9.2, upon which Article 12 depends. How “insufficient” does information need to be to cause the process to move through Article 9.1 onto Article 9.2? There was a suggestion that a lack of scientific advice would cause this, but then Article 9.2b refers back to scientific advice so that cannot be a necessary and sufficient condition. There are no suggestions or indications in the regulation as to what is meant by “other appropriate

measures.” It is possible, under the proposed amendment, that the effort reduction for a stock with very poor data is limited to -15%, while a stock with more information can end up with a -25% effort reduction. This seems counter-intuitive as normal practice would be to be more precautionary as the information base deteriorates.

#### Article 13:

STECF has repeatedly underlined the difficulty for stakeholders to evaluate the compliance to Article 13 requirements: cod avoidance measures must be demonstrated to yield at least as much reduction in Fishing mortality than otherwise would result from effort reduction. This formulation raises a number of issues, and in particular that 1) fishing mortality estimate is linked to the dynamics of the entire fishery, and therefore it is very difficult to monitor the beneficial effects of actions taken by only a subset of the fleet, 2) fishing mortality can only be monitored indirectly and ex-post through the use of an assessment model, and therefore the estimates are only available the year after the actions have taken place (if an assessment can be done at all) and 3) fishing mortality is a fairly abstract concept that the industry cannot monitor and manage directly, and which doesn't have proportional relationship to catches. The EWG proposes a method based on catch that could be used, instead of the F based approach, to demonstrate conformity with the regulation.

#### Article 14:

The implementation of the new Article 14.6 is problematic. A reallocation of quota is difficult in member states where the TAC is limited by relative stability / MS fixed internal allocation. The current draft could be interpreted in a way that quota could be reallocated towards fisheries with high cod bycatches. Fisheries that currently avoid bycatch of cod would need to give quota to fisheries with high cod bycatches. This would create perverse incentives by rewarding those with higher discard rates.

### **3 RECOMMENDATIONS OF THE EXPERT WORKING GROUP**

There are no specific recommendations.

### **4 INTRODUCTION AND TERMS OF REFERENCES**

#### **4.1 Introduction**

In preparing for the development of multi-stock plans, the Commission is considering proposing possible improvements to the cod plan (Council Regulation (EC) No 1342/2008) with regards to the implementation problems identified by STECF (EWG 11-15 and PLEN 12-01). STECF is therefore requested to advise on possible options for amending the cod plan built on the advice already provided in the spring plenary report.

At the beginning of the meeting NS and NWW RACS were offered an opportunity to present position papers. These are attached to the report as Annex I and II respectively.

The report below provides an introductory section on overall approaches to management measures based on work set up following the EWG 11-15 which reviewed the cod plans in

December 2011. Several sets of different general management approaches were selected and both industry and compliance experts were asked to contribute to an understanding of their effectiveness. Section 5 below presents results so far from these investigations. This is not intended as a direct comment on the proposed amendments for the cod plan but rather to inform the debate on the overall approach to achieving catch management, with particular relevance to cod caught in mixed fisheries.

Section 6 addresses the specific amendments to the Council Regulation 1342/2008 provided below in Section 4.3. In addition to specific comments to the regulation, the EWG provides information to help with the provision of management advice for cod stocks without assessments (Section 6.1) and calculation methods based on catch for situations where effort buy-back requires a comparison with the reduction in F (Section 6.4)

#### **4.2 Terms of Reference for EWG-12-07**

Review the draft Commission proposal as regards amendments for Article 9, 11 and 13 of the cod plan (see section 4.3) and the alternative option provided by Member States.

Suggest alternative proposals, or ways in which the proposals could be improved or simplified as appropriate

Discuss the pro and cons for each option proposed compared to existing fishing effort management methods

#### **4.3 Proposed amendments to cod plan received from the Commission for the EWG meeting**

##### *Article 9*

##### **Special procedure for setting TACs**

1. Where there is insufficient information to set the TACs in accordance with Article 7 or Article 8, a TAC shall be adopted at the catch level corresponding to the level indicated by scientific advice, provided this is no more than 20% greater than, or 25% less than, the TAC in the previous year.
2. Where there is insufficient information to set the TACs in accordance with Articles 7, 8 or 9(1), a TAC shall be adopted at the catch level corresponding to:
  - (a) a 25 % reduction compared to the TAC in the previous year,  
or, if the scientific advice so recommends,
  - (b) up to a 25% reduction compared to the TAC in the previous year together with other appropriate measures.
3. By way of derogation from paragraphs 1 and 2, where there is insufficient information to set the TAC in the North Sea, the Skagerrak and the eastern Channel in accordance with Article the appropriate level of TAC will be fixed following consultations with Norway.’
  - (1) Paragraphs 2 and 3 of Article 11 are deleted
  - (2) The following Article 11a is inserted:

**Derogation from the application of the fishing-effort regime**

1. Fishing effort used by a vessel during a trip shall not be counted against the maximum allowable fishing effort for the effort group concerned provided that:
  - (a) the entire fishing activity of that trip by the vessel concerned is deployed only within an area outside cod-distribution areas as listed in accordance with paragraph 2 and/or at a depth greater than 300 m;
  - or
  - (b) the fishing vessel has only one regulated gear on board, the technical attributes of which result in cod catches of less than 1.5% of the total catches measured by weight and listed in accordance with paragraph 2.
2. Acting on a Commission proposal, on the information provided by Member States in line with the obligation set out in paragraph 3, and in accordance with scientific advice, the Council shall establish a list of areas and gears as referred to in paragraph 1 (a)(b). The areas and gears listed shall be exempt from applying the effort regime.
3. Member States shall provide the appropriate data and information to allow the Commission to assess whether an area or a gear shall be on the list of the areas and gears to which fishing-effort limitations would not apply.
4. If the fishing effort associated with the fishing activity provided for in paragraphs 1(a) or 1(b) contributed to establishment of the baseline effort established in accordance with Article 12(2)(a), then the amount of effort associated with that activity shall be deducted from the baseline of the effort group concerned.
5. Requests for exemption from the fishing-effort regime entailing adjustment of the baseline effort established in accordance with Article 12(2)(a) shall be submitted by Member States to the Commission within one year of the entry into force of this Regulation. Beyond that date, the Member States shall not be entitled to exclude any fishing activity that might comply with the conditions referred to in paragraphs 1(a) or 1(b).
6. If the fishing effort associated with the fishing activity provided for in paragraphs 1(a) or 1(b) has not contributed to establishment of the baseline effort, then the maximum allowable fishing effort of the effort group concerned remains unchanged.
7. Detailed rules concerning the format and procedure for the transmission to the Commission of the information referred to in paragraphs 3, and 5 may be adopted by the Commission by way of implementing acts in accordance with the procedure referred to in Article 32.'

(3) Article 12 is amended as follows:

(a) Paragraph 4 is replaced by the following:

'4. For aggregated effort groups where the percentage cumulative catch calculated according to paragraph 3(b) is equal to or exceeds 20%, annual adjustments shall apply to the effort groups concerned. The maximum allowable fishing effort of the groups concerned shall be calculated as follows:

- (a) where Articles 7 or 8 applies, by applying to the baseline the same percentage adjustment as that set out in those Articles for fishing mortality;
- (b) where Article 9(1) applies, by applying the same percentage adjustment in fishing effort as the adjustment of the TAC compared with the previous year;

- (c) where Article 9(2)(a) applies, by applying a 15 % reduction compared to the maximum allowable fishing-effort allocation for the effort groups concerned in the previous year
  - or if the scientific advice so recommends
  - (d) where Article 9(2) applies, by applying up to a 15 % reduction compared to the maximum allowable fishing-effort allocation for the effort groups concerned in the previous year, together with other appropriate measures.
- (4) Paragraph (2)(b) of Article 13 is replaced by the following:
- ‘(b) that can demonstrate to the Member State whose flag it is flying that its fishing activity results in a catch composition, including discards, of less than 5 % cod over the management period.’
- (5) In Article 14 the following paragraphs 6 and 7 are added:
- ‘6. Where the scientific data indicate that more than [10%] of the total cod catches for a particular effort group are attributed to discards, or where the quota allocation does not correspond to the expected catches and would likely result in cod discards, the Member State concerned shall take immediate measures to minimise cod discards.
7. Member States shall establish and include in their national control action programmes, as prescribed in Article 46 of Regulation 1224/2009, systems to ensure compliance with the conditions referred to in Articles 11a, 11b and 13. Member States shall assign a ‘very high risk’ level to those vessels in their risk-based management as described in Article 5(3) of Regulation 1224/2009.’

## **5 MANAGEMENT OPTIONS FOR THE NS – FISHERMEN AND THE EFFECT ON ENFORCEMENT**

### **5.1 Introduction**

The evaluation of multi-annual plans for cod in Kattegat, North Sea, Irish Sea and West of Scotland carried out by STECF in July 2011 indicated that landings quotas and effort were unlikely to deliver the objectives of the plans over the next few years. A number of issues were identified, in particular that landings quotas were unable to constrain catches of cod in these areas and that overall effort restrictions were having impacts well beyond the cod fisheries without yet delivering reductions in cod mortality.

The STECF group that scoped options for the European Commission for the future (STECF EWG 12-15) has defined a range of management options for future plans. These were explored through an online questionnaire to fishermen and analysed from an enforcement perspective. Long term management plans require cost-effective and stable control measures that will deliver overall aims, but also provide some scope for flexibility if conditions require modifications to targets or objectives. It is important therefore to consider the implications of control measures from the perspective of those enforcing the rules (the member state enforcement bodies) as well as from the perspective of those whose actions are being controlled (the owners/operators of fishing vessels). This section tries to do that by exploring some of the cod management proposals from the perspective of enforcement through an evaluation of different control measures, and through asking a small sample of active fishers for their views

on how a small range of alternative management options might impact on their fishing activities and their businesses.

In all cases the management options explored should be implemented on the national, regional or EU level.

## **5.2 Management measures suggested by the STECF**

The candidate management measures suggested by the STECF for the NS included the following:

*The current plan:* Continued use of the basis of the current plan (landings TACs, effort control with derogations) but with simplified and more consistent derogations for fleets reducing cod catch.

*Mixed fishery landings quotas:* Mixed fishery landings quotas matched across species.

*Mixed fishery catch quotas:* Mixed fishery catch quotas matched across species with in year increases if catches of cod kept below limits.

*Individual vessel/business catch quotas:* A system of individual vessel/business catch quotas set at single species level but tie up once any quota is exhausted.

*Real time effort incentives:* Effort based real time incentives (RTI) based on spatial effort allocations where effort is expended at higher tariffs for more critical areas.

All management measures apart from the current plan involve:

- Setting of mixed-fishery TACs for fisheries at the European level – agreed by Member States. These would be TACs for individual stocks which are set in a way that accounts for the fact that the different stocks are caught together in mixed-fisheries.
- Operation/implementation for landings or catches at or below the target at Regional/MS level.
- Where catches are to be controlled, fishermen must agree that it is their responsibility to show that they are catching under the limits.
- As a general principle non-compliance must carry sufficiently appropriate penalties.
- This may involve specific contracts between licensees and MS authorities
- Minor over-catch that is declared should be dealt with by banking and borrowing (i.e. max 10 %) for vessels between years at MS level, and not considered an offence. This also requires that borrowing/banking is permitted between the MS and the EU.
- Non-compliance that does not result in excess/inappropriate catch could be dealt with initially by low penalties, which would be raised for repeated offences.
- Non-compliance which results in significant false/under declaration of catch by should have penalties set taking the probability of detection into consideration as well as the potential financial gain detected, including removal of future fishing opportunities.



- Excessive penalties would be unfair and unreasonable but failure to have sufficiently stringent penalties will incentivize non-compliance.

### 5.3 Management measures effect on enforcement and compliance

Each of the five management options was broken down into management components which were then evaluated from an enforcement perspective using the following criteria:

- *Controllability* - is the management measure possible to control?
- *Enforcement tools* – how will the management measure be controlled in practice?
- *Cost-effectiveness* - Is the control measure cost effective?
- *Compliance* - What are the requirements for compliance?
- *Infringements* - What are the types of infringements that can occur in relation to the management measure?
- *Obstacles* - Are there any obstacles for the fisherman to comply with the management measure?
- *Incentives* - Can incentives for compliance be created?

Annex III contains a more detailed analysis from which the following results are drawn

### 5.4 Results of the enforcement analysis

Following the evaluation it was apparent that the *individual vessel/business catch quotas management option*, with some additions, is the preferred option from an enforcement perspective. In summary the management option includes:

1. Catch quota management (CQM) and fully documented fisheries (FDF)
2. Individual vessel/business catch quotas
3. Seasonal and area measures

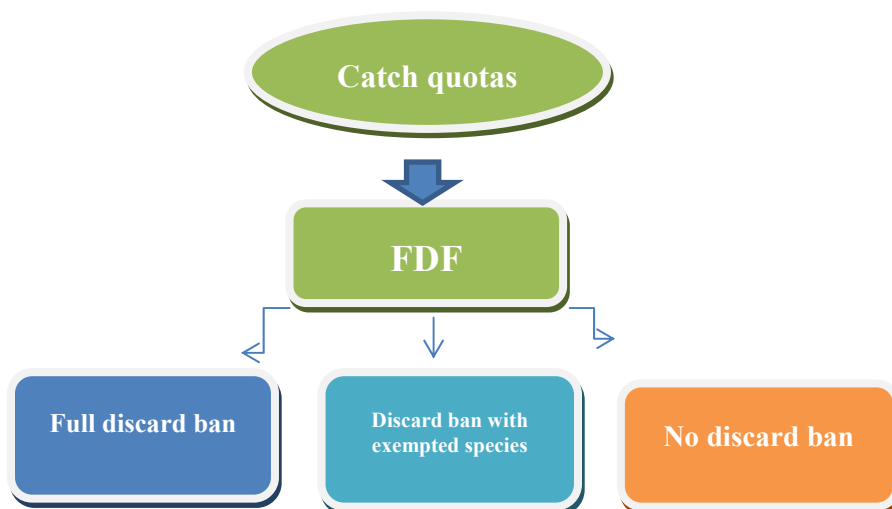
### 5.5 Catch Quota Management (CQM) and fully documented fisheries (FDF)

The enforcement problem consists of ensuring that the fishers fully document the extraction from the resource, i.e. that all catches are being fully reported in the logbook as either landings or discards (FDF). The cost and efficiency of the enforcement tools used to enforce the catch quota management system will vary depending on whether or not discarding is regulated.

The diagram below illustrates that CQM and FDF can be regulated in combination with a full discard ban, a partial discard ban with exempted species, and without a discard ban but where catches and discards are reported in the logbook. All options are difficult to enforce but a full discard ban is clearly superior to the other alternatives. In addition to achieving the greatest confidence in catch levels it is also the least difficult as well as the most cost-effective option to enforce.

Controlling a CQM/FDF system in combination with any of the options for regulating discarding practices requires monitoring of the fishing activity at sea where the discarding takes place. There are four enforcement tools that allow for that; on board observers, patrol vessels, aircraft and CCTV-systems (sensors, GPS, cameras). Other enforcement tools such as landings and administrative controls can be used to identify irregularities in the length and catch composition that indicate discarding has taken place.

CCTV-systems can provide coverage of the all fishing activities for a fraction of the cost of other enforcement tools at sea. For this reason it is a superior tool from an enforcement perspective whilst also providing highly useful information on the fishing activity through electronic sensor and GPS<sup>44</sup> data.



<b>Verification needed</b>	That no catch is discarded.	That no catch of included species is discarded (possibly by species and quantity).	Quantity and species discarded.
<b>Reporting</b>	Logbook = catch Landings declaration = catch	Logbook = catch + discards Landings declaration = catch – allowed discards	Logbook = catch + discards Landings declaration = catch - discards
<b>Infringement</b>	Discard ban	Discard ban and misreporting	Misreporting
<b>Confidence in catch levels (1 highest)</b>	1	2*	3
<b>Cost (1 highest)</b>	3	2*	1

\* If exempted species are only present in some fisheries and/or are very different in size etc. from other catch, controllability can be improved.

<sup>44</sup> can provide geographical position every 10 seconds

### *Individual vessel/business catch quotas*

The enforcement problem consists of ensuring that the catch is reported accurately and counted in the quotas. By introducing a FDF-system that is primarily controlled by a CCTV-system in combination with other enforcement tools such as landings control, this can be achieved.

From an enforcement perspective individual quotas are preferred over collective quotas since it allows the fishermen to fully bear the benefits of complying with the rules as well as directly bearing the cost of any illegal activity. The initial allocation of quotas is an important key to achieve compliance. In fisheries with a large overcapacity the initial allocation is difficult. Furthermore, the allocation of choke species in fisheries where the national quota of the species is very small, due to the relative stability, is difficult.

### *Gear, area and time measures*

To limit discarding the technical measures in place have to support and allow for a selective fishery. In the North Sea these measures have the benefit of already being in place, i.e. systems have been put in place and the industry and authorities have adapted to the change.

Controls on area and time measures (e.g. seasonal and/or areas closures) are to a large extent carried out at sea using patrol vessels and aircraft. Other tools used are VMS systems to track where the fishing activity takes place.

Time or area closures, without exception, are preferred to technical regulations since it makes control at sea easier and more cost-effective. In general limiting regulations such as 'one net' rules and fishing in specific limited areas per trip ease the control burden.

### *Concluding remarks on enforcement*

From an enforcement perspective a slightly modified version of the individual vessel/business option should be implemented for the NS. This management option is primarily a catch quota management (CQM) system in which the quotas are allocated to the individual fisherman or business. The accuracy of the reported catch is ensured by CCTV systems within the framework of a fully documented fishery (FDF).

In order for the management option to achieve its objectives it is important that the effect on compliance and enforcement of the entire system of management measures is considered. From this perspective it is crucial that the control measures:

- are harmonized over regions and MS as far as possible to avoid actual or perceived unfairness.
- are kept to a minimum to avoid spreading limited control funds over a large number of measures.
- ensure that the fishers receive the benefits of complying with the rules as well as bearing the costs of non-compliance.
- carry appropriate penalties for non-compliance; failure to have sufficiently stringent penalties could incentivize non-compliance.
- consider incentives for fishers to comply with the rules.
- are stable over time (as far as possible) to avoid confusion and mistakes.
- are understood and accepted by the industry

- are applied in the most cost- efficient way using the appropriate tools and intensity to control each management option.

## 5.6 Results of the survey of vessel owners/operators

An on-line questionnaire was developed to explore views of vessel owners/operators to the different management options. Only 19 useable responses were received. Of these all respondents operate in the North Sea, 4 in the West of Scotland, 2 in Eastern Channel, and 4 in other areas. A total of 12 respondents were targeting cod, and other key species include haddock, saithe, whiting, and monkfish.

Each management approach was explained more fully in the questionnaire using a sketch of a fishing boat and short summaries highlighting key aspects of the proposed management regime. Each management approach was described using the bare minimum of information to get across the main aspects of the approach. The same set of questions was asked about each management approach in turn to obtain respondent views on whether the approach would be more difficult, no different, or easier than the current situation for the following activities:

- Managing my fishing effort
- Controlling costs
- Managing my cod quota
- Managing my quota for other species
- Reducing discards of cod
- Reducing discards of other species
- Using my knowledge and judgement about when and where to fish
- Fish safely
- Adapting my effort to the weather and other environmental conditions

Respondents were also asked to indicate potential financial impacts (i.e. changes in annual income, profit, input costs (fuel, supplies, new gear, repairs), and number and type of crew employed), and provide an indication of how difficult they felt it would be to enforce the approach.

The Individual vessel/business catch quota option was viewed as the least favourable approach. More than half of respondents indicated that under this option the following activities would be more difficult:

- Managing my fishing effort
- Managing my cod quota
- Managing my quota for other species
- Reducing discards of cod
- Reducing discards of other species

In addition more than half of all respondents indicated fishing safely and adapting to weather and conditions would be no different. More than half of respondents indicated the approach would have a negative impact on annual income and profit. Five respondents indicated that managing effort, cod quota and cod discards would be easier, and four indicated a positive impact on annual income from fishing activities. When asked for specific opinions on the approach the focus of respondents was on the impact of the quota issue on their activities. Problems identified included:

*“I cannot take my entire quota”*

*“Will not work because the small quota on whiting would stop you fishing within weeks”*

*“Unworkable – impossible to stop fishing when one species is caught”*

*“Most would be forced to sell up or go bankrupt”*

*“Cannot stop fishing when one species is caught”*

Respondents also indicated that the perceived abundance of cod caused problems in terms of meeting or exceeding their quotas:

*“It’s impossible to fish and avoid cod due to their abundance”*

*“There has always been a dominant species, - trying to regulate the fishery on one species will always result in abuse and discards of the dominant species”*

When respondents were asked about benefits of the approach they also focused on the quota issue:

*“Vessels with high quota will be able to fish as they should those that have no quota will have to stop fishing sooner”*

*“Reducing discards and getting extra quota in long term will reduce leasing costs”*

The views provided by the respondents suggests that those who had adequate quota would be better off under this management approach, but those with low quota would suffer, because as soon as their quota for a species was used up they would have to tie up. The nature of the on-line questionnaire suggests that some of the respondents picked up on this particular aspect of the proposed approach and it strongly influenced their opinions.

What is interesting from the responses received is the level of support for particular implementation techniques. There appears to be general support for activities such as banking and borrowing from one year to the next, and for CCTV. Examples of responses include:

*“CCTV is very good on reducing cod discards and making the skipper think where to fish and with what size”*

*“Reducing discards and getting extra quota in the long term will reduce leasing costs. In favour of expanding CCTV to certain boats/species”*

*“Banking and borrowing with a 15% limit would help”*

*“Banking and borrowing is a good idea”*

In terms of ease of enforcement the majority of respondents felt that the current plan would be easiest to enforce, and the mixed fishery catch quota option the most difficult. Respondents were equally divided over the ease with which the individual vessel/business catch quotas option and the real time incentives option could be implemented with half thinking they would be easier and half thinking they would be more difficult.

## **5.7 Summary management options**

It is interesting to note that the options selected as the most favourable for enforcement is the one least favoured by the fishermen responding to the questionnaire. This difference can be partially explained through the choice of survey instrument. An on-line questionnaire is not the most appropriate approach to gathering feedback on complex management options, as it is difficult to explain the operation of the management option, and not possible to know if the respondent has completely understood all the details. The evidence from the survey suggests that respondents were most concerned about the suggested limit on fishing once one quota had been exhausted. This may have unduly influenced their opinions of the management option, although there are key socio-economic issues that need to be examined more closely,

relating to the impact of such a measure on vessel profitability, and on the amount of time it might be tied up at the quay. The results do suggest general support for CCTV and fully documented fisheries.

Inevitably, there are varying and divergent views on appropriate and desired management options given the variety of stakeholders and subgroups existing within the fisheries (e.g., varying fleets within and across MS, enforcers, managers, scientists). The two studies of the enforcement implications and fleet views of management options highlight these divergent views clearly. Though the research behind each was preliminary and of a pilot-project standard, the results were indicative of the reality of divergent views held on potential management options. Such varying views must be understood and taken into account when making decisions in order for the management options to be equitable and fair while also being the most appropriate for reaching stated management goals. In short the views of both enforcement agencies and those operating fishing vessels must be taken into account when designing long-term management regimes. Ideally, the control measures should be efficient and reliable as well as easily understood and supported by the fishing industry.

## **6 COMMENTS ON AMENDMENTS TO COD PLANS**

The section below details comments, and in some cases additional information, intended to improve implementation and likely success of the cod plans. They are organised according to aspects that relate to each of Article 9,11-14 in turn.

### **6.1 IMPLEMENTATION OF ARTICLE 9**

Some amendments are proposed to the text and are linked directly with Article 12. As these aspects need to be considered in the context of Article 12, the discussion of these changes is given in section 6.3 which deals with Article 12.

Article 9 concerns the provision of catch/TAC advice in the absence of an assessment. Currently two of the cod stocks have assessments, (West of Scotland and North Sea) but two do not (Kattegat and Irish Sea). The following sections (6.1.1 and 6.1.2) are provided to illustrate two specific examples that could be used for Irish Sea cod and Kattegat cod respectively in the situation that assessments providing short term forecasts are not available. Currently, assessments are available for North Sea and West of Scotland cod stocks. The method described for the Kattegat cod is specific to that situation and may not be generally applicable, but the approach for Irish Sea cod is more generic and based on methods being developed by ICES.

#### **6.1.1 ADVICE FOR IRISH SEA COD IF ASSESSMENT AND SHORT TERM FORECAST ARE UNAVAILABLE.**

STECF draws the following information from the use of ICES WKLIFE/RGLIFE Guidelines in situations where stocks do not have assessments

Of the three cod stocks: North Sea, Irish Sea and West of Scotland, all now have accepted assessments, but catch forecasts are only provided for two (North Sea and West of Scotland). Catch forecasts are not provided for Irish Sea cod because of the high uncertainty associated with mortality values in recent years caused by unaccounted mortality.

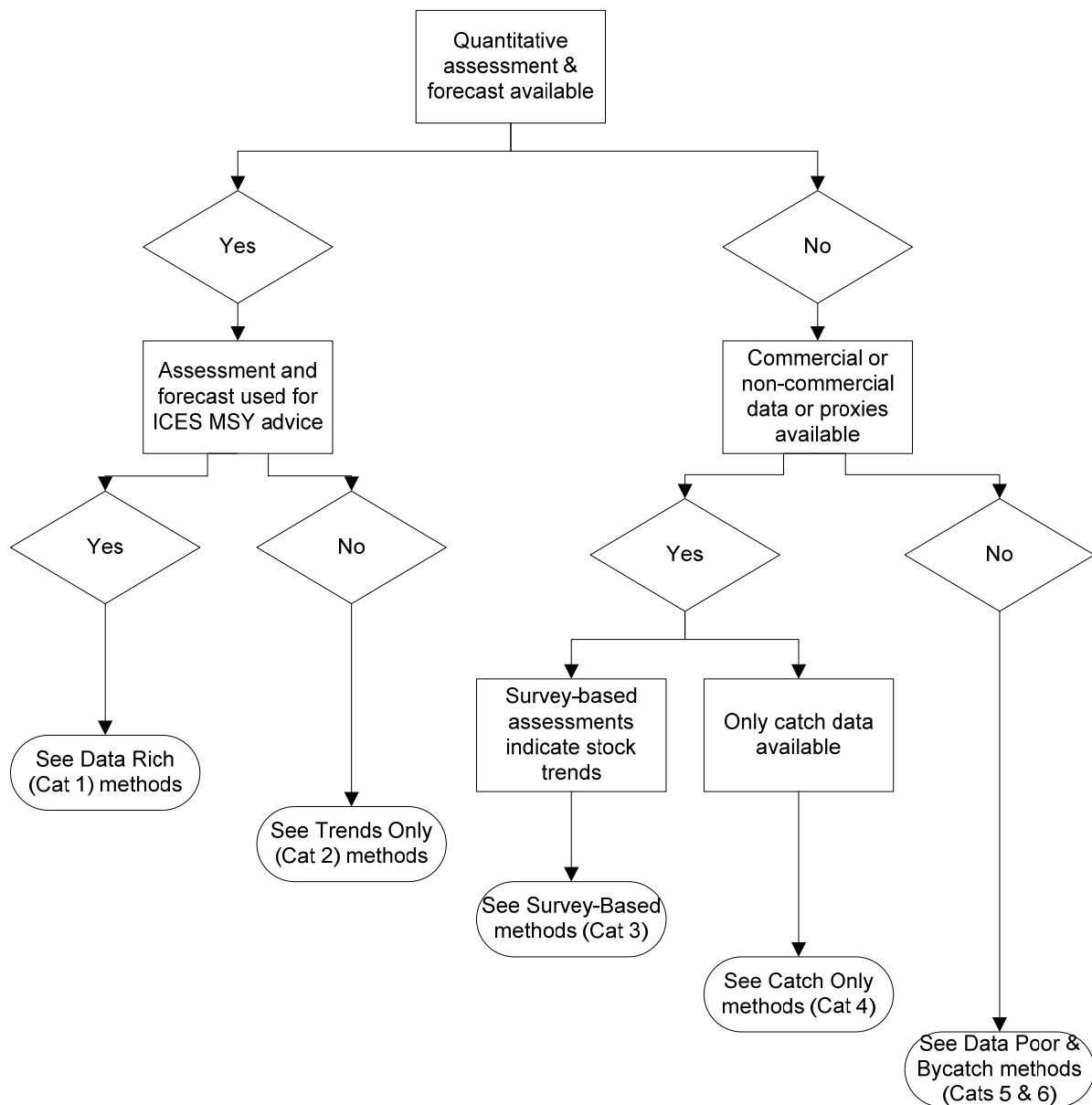
In circumstances where an assessment is no longer available to provide a forecast which could be used to follow the management plan, the ICES WKLIFE/RGLIFE Guidelines could be used as a basis for providing catch advice. These guidelines were developed in order to provide a basis for giving quantitative advice for as many data-limited stocks as possible, for which, until recently (2011), ICES had not provided catch advice. Of over 200 stock for which ICES provides advice, there have been around 122 that were considered data-limited because of a lack of catch forecast (e.g. the was no accepted analytical assessment). These guidelines have been formulated on the basis of outcomes from several workshops and

groups, such as WKFRAME-III, WKLIFE, RGLIFE and other groups within ICES (such as ADGDEEP). These guidelines remain a work-in-progress, with some recommended methods having been simulation-tested, others still requiring such testing, and some simply based on “common sense”. Expert groups within ICES have been encouraged to explore the most appropriate approaches, checking for consistency of application, and providing justification for decisions made.

General principles associated with developing these guidelines have been that stocks are categorised according to available data and analyses, that categories reflect decreasing availability of data (e.g. fishing pressure and state of the stock estimates are less certain moving down the categories), and that increasing precaution is applied in increasingly uncertain situations (more precaution is applied down the categories). The categories are currently defined as follows:

1. Data-rich stocks (quantitative assessments are available for forecasts)
2. Qualitative assessments and forecasts (trends only)
3. Survey only (stock abundance trends)
4. Reliable catch data only (short time-series)
5. Data-limited (landings data only)
6. Minor bycatch or negligible landings

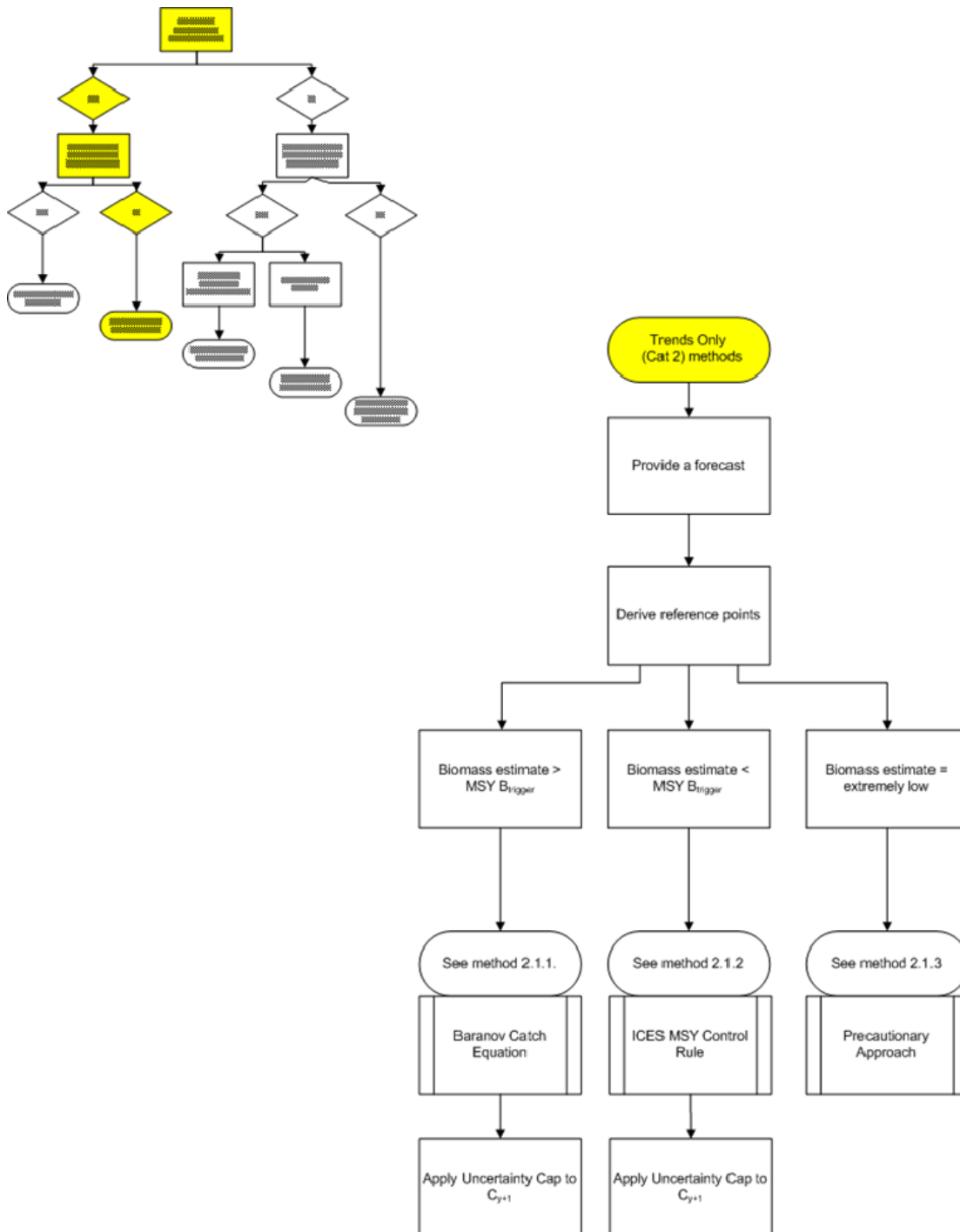
Methods have been developed within each of these categories, according to the following schematic Figure 6./1:



**Figure 6.1** General schematic for provision of advice for stocks with different levels of information

Under this scheme, Irish Sea cod could not be classed as falling under Category 1 because of a lack of forecast under the ICES framework, but could fall under Category 2, which is given in more detail in the following schematic:





**Figure 6.2** General schematic for provision of advice for stocks with Category 2 information:  
assessment indicative of trends

There are three methods under Category 2, but because SSB levels for Irish Sea cod are so low (well below  $B_{lim}$ ), the appropriate method would be applying the precautionary approach, which requires a recovery plan and possibly zero catch.

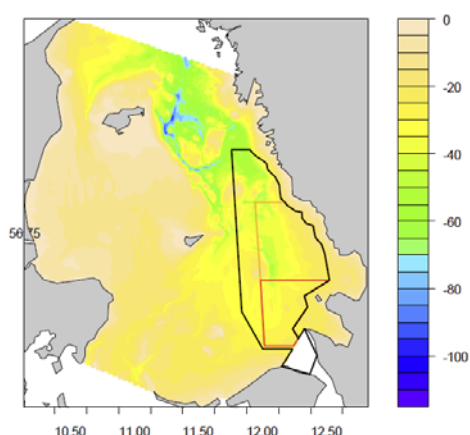
## 6.1.2 ADVICE FOR KATTEGAT COD IF ASSESSMENT AND SHORT TERM FORECAST ARE UNAVAILABLE.

### 6.1.2.1 BACKGROUND FOR KATTEGAT COD ADVICE

The very low cod TAC and even lower reported landings in the most recent years have given a very uncertain ICES stock assessment with respect to estimation of fishing mortality. In

addition the trend of estimated  $F$  depends very much on the option for estimation on unallocated mortality (e.g. due to fishery or due to return migrations of North Sea cod which have entered the Kattegat as juveniles). Consequently, the ICES assessment cannot be used as a basis for evaluating the most recent  $F$  in relation to any  $F$  reference point given in the management plan. This section presents the results of an alternative approach to estimate fishing mortality and discusses the potential use of such information in the management of the Kattegat fisheries. In addition, likely scenarios for the management of Kattegat are discussed.

Today, the main catches of cod in Kattegat are taken by the TR2 trawl segment. Several management measures have been applied to decrease  $F$  on Kattegat cod, and to maintain the present level of TR2 fishing effort for the economically important fisheries targeting Nephrops and sole. The most important measures include the introduction of closed areas (see Figure 6.3) and use of gears with lower retention of cod.



**Figure. 6.3** Bathymetry of Kattegat and Closed Areas:

- The “black” seasonally closed area is closed during the period 1st January to 31st March, except for fishery with selective gears; The “black” area in the Northern Sound (“Kilen” or the Triangle) is closed 1st February to 31st March, except for fishery with selective gears;
- The “orange” partially closed area is closed for all fisheries in the period 1st January to 31st March. Fisheries with selective gears are allowed 1st April to 31st December;
- The “red” permanently closed area is closed for all fisheries, including recreational fisheries.

The main gear used by the TR2 segment of the Danish fishery before 2009 was a trawl with 90mm diamond mesh cod end. The use of a 120 mm square mesh panel became mandatory in February 2009. Since August 2011 trawls equipped with 180 mm square mesh or 270 mm diamond mesh SELTRA have been mandatory for Jan-Sep, while 120 mm square mesh panel is also allowed in the rest of the year to obtain a higher catch rate of sole. In addition a SELTRA 300 mm square mesh panel can be applied year round. This gear gives access to the closed areas when selective gears are required.

The standard gear for the Swedish fisheries was a trawl with 90 mm diamond mesh cod-end. There has been a shift towards use of trawl with sorting grid in combination with a 70 mm square mesh cod-end, such that 59% of the TR2 effort in 2011 was applied with that gear. The sorting grid gives access to the closed areas when selective gears are required.

#### 6.1.2.2 ANALYSIS OF CHANGES IN FISHING IMPACT

The relative fishing impact (proxy for fishing mortality) has been quantified for the Danish and Swedish TR2 segments which are the most economically important fishery in Kattegat and the fishery with the largest cod catches. Fishing impact is calculated from the temporal and spatial distribution of the cod stock (estimated from survey observations) and the fishery

effort (estimated from VMS). It is assumed that fishing impact is proportional to the sum of the product of the local cod density, local fishing effort and the size selection of the applied gears. In other words, the method gives a prediction of the fishing impact on the cod stock, given that we know the distribution of the cod, the distribution of the fishery and the gear applied.

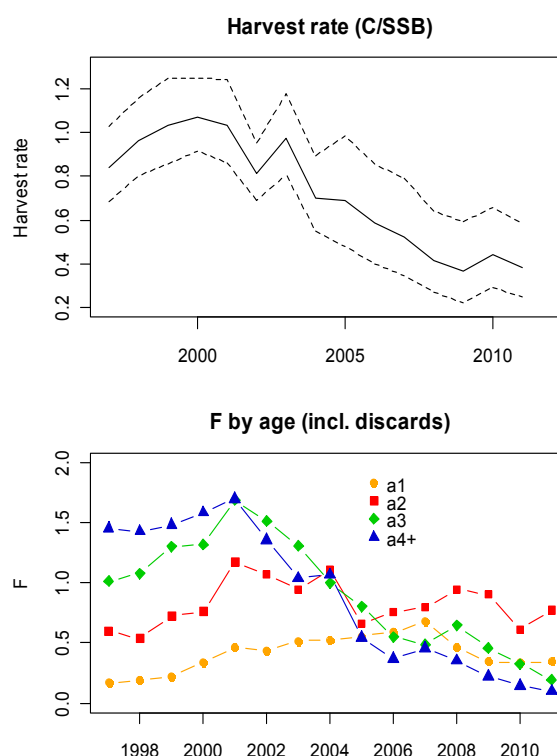
### 6.1.2.3 RESULTS FOR FISHING IMPACT

The fishing impact on cod in 2011 was estimated by effort model to be reduced to 41%, 35% and 31% of the level in 2008 (i.e. before the area closures were implemented), for age 1, age 2 and age 3 plus, respectively (see table below).

Year	Age 1	Age 2	Age 3+
2008	100%	100%	100%
2009	69%	54%	47%
2010	59%	47%	44%
2011	41%	35%	31%

The reduction in fishing impact was highest in the first year of the area closures, followed by modest (absolute) further reductions in succeeding years.

Sensitivity analyses show that the assumed size selection of cod by the different gears has a direct effect on the absolute modelled fishing impact. However, the modelled change in fishing impact between years seems rather robust to the choice of size selection parameters as long as the values used are reasonable well estimated.



**Figure. 6.4** Harvest rate, i.e. catch (landings plus discards) divided by the SSB (upper panel); and fishing mortality by age (lower panel) from the assessment run including discard data, and no estimation of unallocated mortality. (from ICES 2012).

F estimates from the ICES assessments (Fig 6.4) have a similar reduction for age 3 and older cod as modelled by the fishing impact analysis. The available discard data indicate a stable high fishing mortality on cod age-groups 1-2 in 2008-2011 when used in the assessment. This is in contrast to the reduction as modelled by the fishing impact analysis. The assessment F

values are however, from an assessment without estimation of unallocated mortality (e.g. return migrations of North Sea cod which have entered the Kattegat as juveniles) which will have a pronounced effect on age 2 where around 50% are assumed sexually mature and the North Sea recruits are expected to migrate back to the North Sea. In addition the absolute level of discard mortality depends very much on the natural mortality applied (0.20) of juveniles. A higher natural mortality (e.g. around 1.0 for age 1 and around 0.7 for age 2 as used in the North Sea cod assessment) will decrease the estimate of discard mortality considerably.

The harvest rate estimates by ICES show a rather stable rate since 2008 and do not confirm the results from the fishing impact analysis. Harvest rates have been calculated as the sum of catch of both juveniles and adults over the biomass of adults (SSB). Harvest rate showing the sum of catch weight of adults (weight at age times proportion mature at age) divided by the SSB (Figure 6.4 Upper panel) show the same trend as the ICES version.

#### 6.1.2.4 FISHING IMPACT AND THE MANAGEMENT PLAN

The present cod management plan includes a target  $F_{3-5}$  at 0.4 for Kattegat cod. Fishing impact on age 3 plus (equivalent to ages 3-5) in 2011 is modelled to be 31% of the value in 2008. Therefore, the absolute  $F_{3-5}$  modelled by this method is at present below target  $F$  at 0.40 (for  $SSB > B_{pa}$ ), given a (high)  $F$  of around one in 2008 ( $F_{3-5}$  or more correctly,  $Z-0.2$ , is estimated within the range 1.11 and 0.45 by the two ICES assessments (ICES 2012)). However, SSB is low and most likely below  $B_{lim}$ . In such cases the management plan dictates that  $F$  shall be reduced by 25% per year (equivalent to  $0.75^3 = 42\%$  of the  $F$  level remaining after a period of 3 years), which is a smaller reduction than the modelled realized reduction in fishing impact. These calculations indicate that the aim of the management plan to reduce  $F_{3-5}$  has worked, but the objective to rebuild SSB to above  $B_{pa}$  has clearly not been reached, even though an increase in SSB has been detected from this analysis and the ICES stock assessment (Figure 6.5).

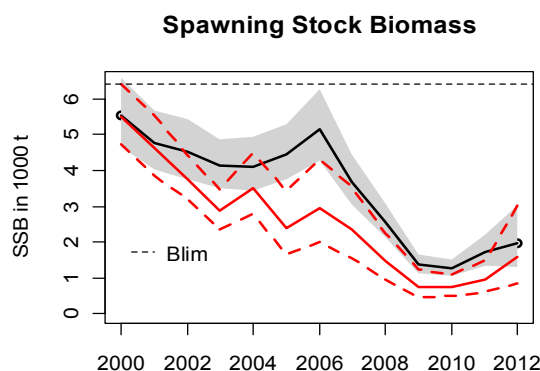


Figure 6.5. Spawning stock biomass of cod in the Kattegat estimated in ICES assessment: i) excluding discards and estimating total removals within the model (black line) and ii) including the discards (red line). Shaded area and dashed lines represent 95% confidence intervals for the two runs, respectively (ICES 2012).

#### 6.1.2.5 FISHERIES IMPACT AND OTHER ANALYSIS USED TO AS SUPPLEMENT TO THE ICES ASSESSMENT.

The two ICES assessments provide very different  $F$  values, but the SSB estimates in these assessments seem less sensitive to the assumption of unallocated mortality. This does not mean that the result is unbiased, but ICES accepts the SSB results as basis for the advice. The fishing impact analysis does not make use of landings and discards and is not sensitive to “unallocated mortality” as long as the return migration is fairly stable and does not lead to substantial changes in the cod distribution. One approach could therefore be to use the biomass estimate from the ICES assessment and the modelled fishing impact as proxy for fishing mortality.

There is presently no  $F_{msy}$  defined for Kattegat cod. For the North Sea cod  $F_{msy}$  is presently set at  $F_{max}$  which is within the range of fishing mortalities consistent with  $FMSY$  (0.16–0.42) (ICES 2012). With an  $F_{msy}$  for Kattegat cod in the high end of the range specified for North Sea cod, the estimate of  $F$  for 2011 is below  $F_{msy}$ .

The harvest rate plots (Fig 6.4 and 6.5) show both a substantial decline in harvest rate down to a value of around 0.4 in 2011. There is a large uncertainty around the estimate of discard for the individual years, but given a good observer coverage or FDF the harvest rate method will give a robust estimate of harvest rate, which can be seen as a proxy for fishing mortality. This information could be used for management in cases where a full assessment is not available (Article 9b).

#### **6.1.2.6 SCENARIOS FOR APPLICATION OF THE MANAGEMENT PLAN FOR KATTEGAT COD**

With the present situation, where no analytical assessment for use in management is available, but SSB is likely below  $Blim$ , Article 9a (Procedure for setting TACs in poor data conditions) is applied which results in a TAC reduction at 25%. With a TAC at 133 t in 2012, the absolute reduction in potential landings is minimal. However, Article 12, 4(b) dictates the same percentage adjustment in fishing effort as the reduction of the TAC, equivalent to 25%. With the presently low SSB (Fig 6.6) of less than 2kt it will take several years to rebuild to  $Blim$  (6.4 kt) and even longer to rebuild to  $Bpa$  (10.5 t). As long as SSB is below  $Blim$  application of Article 9a (“where STECF advises that the catches of cod should be reduced to the lowest possible level”) will require a 25% reduction of both TAC and effort each year. For higher SSB, the default annual reduction in TAC and effort is 15% (Article 9b) but the regulation is open for other options.

A range of management measures to reduce cod catch has been applied for Kattegat and the results from the analysis of fishing impact show a substantial reduction in fishing mortality within 4 years. It is not known if the reduction in  $F$  is sufficient to bring SSB back to the preferred level, but it will take several years for the cod stock to recover to above  $Bpa$  even with no fishery. In the meanwhile application of the management plan will have reduced allowed effort to a very low level and in practice closed the fisheries for demersal fish and *Nephrops* in Kattegat. This may not have been the intention of the MP. A less drastic effort reduction may be appropriate for cases like the Kattegat cod once all fleets can be shown to be operating correctly within derogations such as those under Article 11 and 13.

Given an analytical assessment for Kattegat cod, a 25% reduction in  $F$  is required for SSB below  $Blim$  (Article 7). The same percentage adjustment as used for  $F$  must be applied for effort. This means that the effort reduction is the same as when Article 9 is applied, such that effort will become close to zero before SSB eventually reaches  $Blim$ .

If SSB increases rapidly in the future to between  $Blim$  and  $Bpa$  or for SSB above  $Bpa$  an  $F$  reduction of 15% and 10% respectively must be applied, but  $F$  cannot be smaller than 0.4. The same percentage adjustment as used for  $F$  (after adjustment to 0.4) must be applied for effort. For the Kattegat case this will stop the effort reduction and lead to a TAC increase of up to 20%. With a TAC in 2012 at 131 t and potential further 25% reductions in the coming years, a 20 % increase in TAC will just give an insignificant increase in absolute terms. Such low TAC would lead to a substantial discard in the demersal fishery. However, this problem is conditional on relatively good recovery of the stock.

In case of several years with 25% effort reduction, the *Nephrops* fishery may continue if trawls with sorting grid are applied, given an Article 11 exemption for effort reduction. This will exclude catches of cod larger than 40 cm, but result in a significantly higher catches of juvenile cod compared with the catches from the presently used SELTRA trawls. The use of sorting grid will lead to a substantial loss of landings of fish species like sole and plaice and might decrease catches of *Nephrops* as well.

#### 6.1.2.7 SUMMARY OF KATTEGAT COD ADVICE WITHOUT AN ASSESSMENT

- The ICES stock assessment is too uncertain with respect to estimation of fishing mortality to be applied for evaluating the most recent  $F$  in relation to any  $F$  reference point given in the management plan.
- This uncertainty about  $F$  is mainly due to a high factor estimated for “unallocated mortality”. The assessment model scales landings to give the best fit to survey cpue. However “unallocated mortality” seems more to be due to return migrations of North Sea cod which have entered the Kattegat as juveniles. This raises the question about the validity of both the assessment and stock identity of the “Kattegat cod”.
- Denmark and Sweden have established closed areas in 2009 and their fisheries have changed to more selective gears to decrease fishing mortality of cod.
- A spatial analysis, independent of catches and “unallocated mortality”, shows that the fishing impact (a proxy for Fishing mortality) on cod age 3+ in 2011 is 31% of the value in 2008. This reduction is due to the closed areas, use of more selective gears and a general effort reduction.
- By combining the change in fishing effort from the fishing impact analysis with the change in  $F$  estimated by the ICES assessment,  $F_{3-5}$  in 2011 is estimated to be lower than the target  $F$  (0.4) and a likely proxy for  $F_{msy}$ .
- Estimates of harvest rate provide a robust estimate of the trend and absolute level of fishing mortality. Analysis shows a substantial decline in harvest rate since 2000 down to a value of around 0.4 in 2011. Information on trend and absolute value of harvest rate and fishing impact should be used as  $F$  proxies for management in cases where a full assessment is not available (Article 9b).
- Even though SSB for 2012 is estimated considerably higher compared to 2009 (45% to 112% increase depending on the ICES assessment used), SSB in 2012 is still estimated to be below 2kt.
- The management plan will result in a 25% reduction in effort by year with application of both Article 7 (assessment is available) or Article 9 (no assessment is available), as SSB is far below  $B_{lim}$  (6.4 kt).
- The management plan will lead to a 25 % effort reduction per year for several years. as recovery to above  $B_{lim}$  needs a 3-fold increase in SSB. This will reduce effort to close to zero.
- The management plan has no lower limit for target  $F$  or effort. For the Kattegat cod this will likely lead to a substantial effort reduction and in practice close all fisheries for demersal fish, before the cod stock is recovered. This is due to the time lag between the introduction of substantial measures to decrease  $F$  and the rebuilding of the stock.
- With SSB above  $B_{lim}$ , Article 7 will probably not lead to further effort reduction. Article 9 operates with a default 15% effort reduction for such situations but no further effort reduction could also be an option. Good quality information on  $F$  proxies and SSB is available to substantiate advice from STECF on management in cases where Article 9 b is applicable.
- TAC in 2012 is at 133 t. Further reduction in TAC has practically no direct economic implications for the fishery.

## 6.2 PROPOSED CHANGES TO ARTICLE 11

Table 6.1 presents the text of the current Article 11, the problems identified by the joint STECF-ICES evaluation of the cod plan, and the proposed amendments by the Commission.

The first problem that the evaluation had identified is that one of the three possible causal mechanisms that would lead to low cod catches may be the depleted status of the stock (depletion decoupling) and that in such a case approving exemption would have undesirable effects. The evaluation recommended that exemptions should only be approved when the fishing activity is deployed outside the distribution area of cod (spatial decoupling), or if deployed within the cod distribution area, when the used fishing gear is designed and confirmed to minimize cod catches (technical decoupling). The proposed amendment accounts for this, by removing the possibility to gain exemption based on low catches based on depletion; the proposed amendment follows the STECF recommendation to approve exemptions only for fishing activity outside the distribution area of cod and/or fishing with gear that minimizes cod catches.

The second problem identified by the evaluation is the industry's perceptions regarding Article 11. The industry found the process to gain exemption difficult and lengthy. Moreover, they found that there was a lack of transparency over the data to be collected and over the criteria to deliver the exemption (specifically, they experienced the criteria as changing over time and between MS requests). In general the proposed amendment seems to alleviate this problem because the MSs no longer have to apply for exemption for individual groups of vessel; instead the exemption would automatically be granted to vessels when the fishing activity is deployed in an approved area and/or with an approved gear. Observers from the stakeholder organization confirmed that this may be an improvement but warned that issues of defining the gears and areas may come up when trying to implement the amended regulation.

Table 6.1 Current Article 11 clauses, problems identified by STECF and proposed changes to the Article,

Current Article 11	Problems identified by STECF-ICES evaluation 2011	Proposed amendments by Commission
1. The TACs set out in Articles 7, 8 and 9 shall be complemented by a fishing effort regime whereby fishing opportunities in terms of fishing effort are allocated to Member States on an annual basis.		Remains in place
<p>The Council may, acting on a Commission proposal and on the basis of the information provided by Member States and the advice of STECF referred to in paragraph 3, exclude certain groups of vessels from the application of the effort regime</p> <p>provided that:</p> <p>(a) appropriate data on cod catches and discards are available to allow STECF to assess the percentage of cod catches made by each group of vessels concerned;</p> <p>(b) the percentage of cod catches as assessed by STECF does not exceed 1,5 % of the total catches for each group of vessels concerned; and</p> <p>(c) the inclusion of these groups of vessels in the effort regime would constitute an administrative burden disproportionate to their overall impact on cod stocks. If STECF is not in position to assess that these conditions remain fulfilled, the Council shall include each group of vessels concerned</p>	<p>Exemptions through Article 11 require low cod catches. These exemptions should only be approved when the fishing activity is deployed outside the distribution area of cod, or if deployed within the cod distribution area, when the used fishing gear is designed and confirmed to minimize cod catches.</p> <p>Basing monitoring on percentage of cod in the total catch (as in Articles 11 and 13.2b) is flawed, because even when percentages of cod in the catch are low, these catches can still contribute significantly to overall cod mortality if overall catch or effort is high or when abundance is low. Cod by-catch ceilings expressed as percentages of total catch also have a perverse incentive to maintain or increase catches of other species. STECF identified bycatch ceilings as a flaw in the design of the plan. A system based on proportion of total expected cod outtake from the whole fishery would be more appropriate, and likely no more difficult to monitor.</p>	Deleted



in the effort regime.		
3. Member States shall provide annually appropriate information to the Commission and STECF to establish that the above conditions are and remain fulfilled in accordance with detailed rules to be adopted by the Commission.		Deleted
	<p>Basing monitoring on percentage of cod in the total catch (as in Articles 11 and 13.2b) is flawed, because even when percentages of cod in the catch are low, these catches can still contribute significantly to overall cod mortality if overall catch or effort is high or when abundance is low. Cod by-catch ceilings expressed as percentages of total catch also have a perverse incentive to maintain or increase catches of other species. STECF identified bycatch ceilings as a flaw in the design of the plan. A system based on proportion of total expected cod outtake from the whole fishery would be more appropriate, and likely no more difficult to monitor.</p> <p>The industry perception of article 11 is that it is difficult to gain exemption and that it has proved impossible to gain exemption for fleets that catch few cod because of problems of providing sufficient data (see NSRAC submission Annex 2). It is noted in the submission by the NWWRAC (Annex 3) that there is lack of transparency over the criteria to deliver the exemption and over the data to be collected. Secondly, the NWWRAC paper notes that where vessels have been shown not to catch cod, then the exemption should be provided within a shorter time frame.</p>	<p>8. Fishing effort used by a vessel during a trip shall not be counted against the maximum allowable fishing effort for the effort group concerned provided that:</p> <p>(a) the entire fishing activity of that trip by the vessel concerned is deployed only within an area outside cod-distribution areas as listed in accordance with paragraph 2 and/or at a depth greater than 300 m;</p> <p>or</p> <p>(b) the fishing vessel has only one regulated gear on board, the technical attributes of which result in cod catches of less than 1.5% of the total catches measured by weight and listed in accordance with paragraph 2.</p> <p>9. Acting on a Commission proposal, on the information provided by Member States in line with the obligation set out in paragraph 3, and in accordance with scientific advice, the Council shall establish a list of areas and gears as referred to in paragraph 1 (a)(b). The areas and gears listed shall be exempt from applying the effort regime.</p> <p>10. Member States shall provide the appropriate data and information to allow the Commission to assess whether an area or a gear shall be on the list of the areas and gears to which fishing-effort limitations would not apply.</p> <p>11. If the fishing effort associated with the fishing activity provided for in paragraphs 1(a) or 1(b) contributed to establishment of the baseline effort established in accordance with Article 12(2)(a), then the amount of effort</p>

		<p>associated with that activity shall be deducted from the baseline of the effort group concerned.</p> <p>12. Requests for exemption from the fishing-effort regime entailing adjustment of the baseline effort established in accordance with Article 12(2)(a) shall be submitted by Member States to the Commission within one year of the entry into force of this Regulation. Beyond that date, the Member States shall not be entitled to exclude any fishing activity that might comply with the conditions referred to in paragraphs 1(a) or 1(b).</p> <p>13. If the fishing effort associated with the fishing activity provided for in paragraphs 1(a) or 1(b) has not contributed to establishment of the baseline effort, then the maximum allowable fishing effort of the effort group concerned remains unchanged.</p> <p>14. Detailed rules concerning the format and procedure for the transmission to the Commission of the information referred to in paragraphs 3, and 5 may be adopted by the Commission by way of implementing acts in accordance with the procedure referred to in Article 32.'</p>
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One possibility is to require deployment of a gear that has been shown scientifically to give substantial reduction of catch of cod. This could lead to a second clause under Article 11a.1.(b), this might follow the general form:-

11a 1 b2) the fishing vessel has only one regulated gear on board, the technical attributes of which result in inclusion on list if demonstrated to reduce cod catches by 90% or YY% based on scientific experiments and selectivity parameters given. MS must report cod catch for derogated fleet. If collective catches by exempted gear exceed 1.5% or XX% of TAC, then the basis of the list needs revisiting.

Where YY is a large % reduction and XX is a small percentage of the TAC.

Such an approach would have the following advantages:

Granting of exemptions would be less complicated, more transparent, and more equitable across MSs

Relates directly to reduction of cod catches and thus cod fishing mortality rate

Does not encourage fishing of other species, though catches of other species may change if the gear change affects catches of those species.

Not directly dependent on MS quota allocation, thus works for all MS.

and would have the following disadvantages:

Requires detailed specification of how the gear is to be used.

Although a gear may reduce overall cod catches by XX% it may actually increase cod catches of certain (e.g. young) age classes; selectivity is length-dependent and thus reduction is demography-dependent.

In common with all gear based regulation difficult to define accurately in an effective way, and it is essential to verify through monitoring effectiveness in practice.

The third problem identified by the evaluation is that using the percentage of cod in the total catch as an exemption criteria is flawed, because even when percentages of cod in the catch are low, these catches can still contribute significantly to overall cod mortality if overall catch or effort is high or when cod abundance is low. Cod by-catch ceilings expressed as percentages of total catch also have a perverse incentive to maintain or increase catches of other species. A system based on proportion of total expected cod outtake from the whole fishery would be more appropriate, and likely no more difficult to monitor. The proposed amendment does not follow this recommendation and retains the flawed % concept in section 11a1(b): gears whose use would lead to exemption. The EWG extensively considered how this criterion could be modified to ensure that it does not allow excessive catch under the derogation. Table 6.2 shows a range of potential options to replace / augment the 1.5% exemption criterion currently defined in the new proposed regulation. The table summarises the pros and cons for these additional criteria to explain the different possibilities. Some of the options are based on the assumption that monitoring of catch for fleets is not required as implied by the proposed new Article 11 (see below). Others include a requirement to monitor catch.

**Table 6.2**Options to replace / augment the 1.5% exemption criterion currently defined in the regulation giving the pros and cons for these additional criteria.

Exemption Criteria	Pros	Cons
1) Cod catch <1.5% of total catch by vessel (current DGMARE proposal)	Easy to define	Is not necessarily related to cod fishing mortality rate and has the potential to allow continued exploitation.  Has the incentive to catch more of other species
2) Cod catch<1.5% or XX% of landings of all species by vessel	Easy to define  Does not encourage fishing of other species	Is not necessarily related to cod fishing mortality rate and has the potential to allow continued exploitation.  Is sensitive to changes in TACs of other species
3) Cod catch<1.5 or XX% of MS cod quota	Easy to define  Relates directly to cod catches and thus cod fishing mortality rate  Does not encourage fishing of other species	May result in a race for operators within a MS to fill the limit 1.5 or XX%.  Threshold would be different for each MS and may be difficult for some MS to work within if the MS has only a small quota
4) Cod catch < A MS chosen quota allocation.	Easy to define  Relates directly to cod catches and thus cod fishing mortality rate.  Does not encourage fishing of other species.  Flexible for MS to keep fisheries	Does not necessarily result in reduced cod catches  May be difficult for some MS to work within if the MS has only a small quota but a fleet that catches but does not land cod.
5) Cod <1.5% or XX% of landings by vessel.  MS must report cod catch for derogated fleet. Checks are made to ensure that sum of derogated fleets is sufficiently low.(This is option2 including	Does not encourage fishing of other species.  Flexible for MS to keep fisheries  Not dependent on MS quota allocation	Is not necessarily related to cod fishing mortality rate and has the potential to allow continued exploitation. But by monitoring total catch this will be detected.  May be considered at outside spirit of relative

monitoring total catch)		stability.
<p>6) Cod &lt;1.5% or XX% of landings by vessel.</p> <p>MS must report cod catch for derogated fleet. Council allocates part of cod TAC to cover this.</p> <p>This is option2 including provision to cover this by council</p>	<p>Relates directly to cod catches and thus cod fishing mortality rate</p> <p>Does not encourage fishing of other species.</p> <p>Flexible for MS to keep fisheries</p> <p>Not dependent on MS quota allocation, thus works for all MS</p>	<p>More complicated to administer.</p> <p>May be considered as outside relative stability</p>

(where XX is small percentage)

STECF reiterates that % of catch or landing (option 1 or 2) could potentially lead to effects that oppose the plan's intention to reduce F on cod. Options 3 and 4 nominally control cod catch and are simple for MS to administer but STECF recognises that they might difficult for MS if they had insufficient national allocation (option 4). If there is a shortage of allocation this could give rise to a race amongst operators to join a derogation group. Finally options 5 and 6, involve MS reporting total catches, something that would be very beneficial so that it was transparent how the derogated fleet was operating. In this context it should also be kept in mind that the current proposal for the amendment does not include any requirement for monitoring whether the catches in the exempted areas and by the exempted gear remain low. Without such monitoring it is not possible to say whether the exemptions continue to be in agreement with the plan's intentions to reduce F on cod. STECF recommends that a requirement for periodical (annual) monitoring be added such that it can be verified whether the levels of cod catches of exempted vessels still conform to the criteria for entering the exemption. STECF is at present not in the position to advise what kind of data would be required. Similarly, STECF is at present not in the position to advise on the appropriate data and information that Member States shall provide [proposed amendment 11a(7)] "to allow the Commission to assess whether an area or a gear shall be on the list of the areas and gears to which fishing-effort limitations would not apply, and that detailed rules concerning the format and procedure for the transmission to the Commission of the information referred to in paragraphs 3 and 5 may be adopted by the Commission by way of implementing acts in accordance with the procedure referred to in Article 32". STECF reiterates that the Tables that have been in use for the current requests for exemptions [Commission Regulation (EU) No 237/210] did not always give sufficient information for STECF to evaluate the requests (STECF-PLN-12-01) and thus posed problems to complete evaluations consistently.

It should be pointed out that the enforcement and implementation of the proposed Article 11a1(a) could be problematic. It has to be controlled that vessels exclusively fish in areas with a depth  $\geq 300\text{m}$  during a trip. In particular, along the shelf and along the Norwegian trench depth is increasing steeply. Therefore, highly spatially resolved information on fishing activities is needed to identify trips where fishing has taken place exclusively in areas with a minimum depth of 300m to adjust the effort baselines accordingly but also to control current fishing activities. In the current logbook requirements given in EC 1224/2009 Article 14, fishermen are only required to report catch from the relevant geographical area in which the catches were taken. In the context of depths greater or less than 300m these areas are large

and do not correspond to a certain depth above or below 300m. Furthermore, the catch does not have to be reported on haul to haul basis. VMS data can be analysed to derive positions, however, according to EC 1224/2009 the VMS positions only have to be transmitted every two hours making a precise verification of fishing activities difficult. The imprecise information in logbooks in combination with space transmissions of VMS does not allow for a precise matching of data sources. The subgroup would like to put forward the following alternative to resolve the issues.

Exempted vessel could be required to report exact position, depth, and duration of each haul in logbooks. In addition VMS transmissions should be increased to every 30 minutes. Adding these requirements will result in additional control costs by adding another layer and additional data to the administrative control. The fishing industry would also increase their cost in transmitting VMS data. In order to bring the Commission to verify whether the exempted trips fulfilled the criteria MS should submit raw data on logbook, depth, and VMS from the entire fishing trip.

Historic data to adjust effort baselines, however, cannot be improved by the more detailed data. It is up to the member states to provide sensible estimates of historic effort that would have been exempted. As the new Article exempts trips rather than fishing activities of a group of vessel during the whole year, it is not possible for STECF to judge on future exemptions based on historic fishing patterns. Basing exemptions on fishing trips will increase the burden of analysis.

Finally, STECF observes that the phrasing of proposed amendment 11a(6) “If the fishing effort associated with the fishing activity provided for in paragraphs 1(a) or 1(b) has not contributed to establishment of the baseline effort, then the maximum allowable fishing effort of the effort group concerned remains unchanged.” might be incorrect. STECF believes that the paragraph is meant to express that “If the fishing effort associated with the fishing activity provided for in paragraphs 1(a) or 1(b) has not contributed to establishment of the baseline effort, then the baseline fishing effort of the effort group concerned remains unchanged [i.e. nothing is deducted as under the condition of proposed amendment 11a(4)]”.

### **6.3 PROPOSED CHANGES TO ARTICLE 12**

The only part of Article 12 which is subject to alteration in the proposed Commission amendment is section 12.4, which currently states:

4. For aggregated effort groups where the percentage cumulative catch calculated according to paragraph 3(b) is equal to or exceeds 20%, annual adjustments shall apply to the effort groups concerned. The maximum allowable fishing effort of the groups concerned shall be calculated as follows:
  - a. where Articles 7 or 8 applies, by applying to the baseline the same percentage adjustment as that set out in those Articles for fishing mortality;
  - b. where Article 9 applies, by applying to the baseline the same percentage adjustment in fishing effort as the reduction of the TAC.

In the proposed Commission amendment, Article 12.4a remains unchanged. The following table summarises proposed changes to Article 12.4b:

Current Article 12.4b:	Proposed Commission amendments for Article 12.4b:
b. where Article 9 applies, by applying to the baseline the same percentage adjustment in fishing effort as the reduction of the TAC.	<p>b. where Article 9(1) applies, by applying the same percentage adjustment in fishing effort as the adjustment of the TAC compared with the previous year; [constrained -25% to +20%]</p> <p>c. where Article 9(2)(a) applies, by applying a 15% reduction compared to the maximum allowable fishing-effort allocation for the effort groups concerned in the previous year;</p> <p>or, if the scientific advice so recommends,</p> <p>d. where Article 9(2) applies, by applying up to a 15% reduction compared to the maximum allowable fishing-effort allocation for the effort groups concerned in the previous year, together with other appropriate measures.</p>

The relevant proposed amendments to clauses of Article 9, to which Article 12 refers, are as follows:

1. Where there is insufficient information to set the TACs in accordance with Article 7 [Irish Sea and Kattegat HCR] or Article 8 [North Sea, Skagerrak, Channel HCR], a TAC shall be adopted at the catch level corresponding to the level indicated by scientific advice, provided this is no more than 20% greater than or 25% less than the TAC in the previous year.
2. Where there is insufficient information to set the TACs in accordance with Articles 7, 8 or 9(1), a TAC shall be adopted at the catch level corresponding to:
  - a. a 25% reduction compared to the TAC in the previous year,
  - or, if the scientific advice so recommends,
  - b. up to a 25% reduction compared to the TAC in the previous year together with other appropriate measures.

In reviewing these changes STECF EWG reached the following conclusions:

- The proposed amendments are unclear and difficult to follow.
- It is not clear what differentiates Articles 9.1 and 9.2, upon which Article 12 depends. How “insufficient” does information need to be to cause the process to move through Article 9.1 onto Article 9.2? There was a suggestion that a lack of scientific advice would cause this, but then Article 9.2b refers back to scientific advice so that cannot be a necessary and sufficient condition.
- There are no suggestions or indications in the regulation as to what is meant by “other appropriate measures.”
- It is possible, under the proposed amendment, that the effort reduction for a stock with very poor data is limited to -15%, while a stock with more information can end up with a -25% effort reduction. This seems counter-intuitive as normal practice would be to be more precautionary as the information base deteriorates.

## 6.4 PROPOSED CHANGES TO ARTICLE 13

STECF has given clear support for the principles enshrined in Article 13 which provide for direct measures to achieve reductions in cod catches, with the provision for finer scale and fisheries specific measures to be introduced to reduce cod catches, rather than proxy (effort) and ineffective (TAC) tools (see STECF-11-07; PLEN-12-01). However, evaluation of these measures in relation to achieving the desired F reductions under the plan has been problematic. This is because of issues relating to; (a) detecting and disentangling the effects of specific and multiple measures implemented simultaneously; (b) a lack of 'control vessels' against which to compare the changes in cod catches following the introduction of measures (i.e. comparing the catches of participating vessels against non-participating vessels is not sufficient, rather comparing against what would have been caught in the absence of the measures implemented is necessary), and, (c) a lack of F estimates, or concerns relating to retrospective bias and imprecision in F estimates.

In light of these concerns, STECF has recommended catch (landings and discards) control and monitoring as an alternative approach to evaluating the effectiveness of cod avoidance measures under this Article. This requires advising annually on the change in catch needed by fleet segments in order to deliver the F reduction implied by the management plan and then monitoring to ensure that catches remain below these levels.

The Commission has proposed a number of changes to Article 13. From the information provided by the Commission, the following changes have been identified;

Current text (1342/2008)	Proposed text
13.. (b) results in a catch composition of less than 5 % cod per fishing trip (cod-avoiding fishing trips)	‘(b) that can demonstrate to the Member State whose flag it is flying that its fishing activity results in a catch composition, including discards, of less than 5% cod over the management period.’

This appears to simply be a clarification between the French language and English language regulation (EC Regulation 1342/2008) so that additional effort can be allocated where catches of cod are kept to below 5% of total catches for the entire management period (year), and not per trip. No substantive changes are therefore proposed to 13(b).

STECF EWG have noted previously that allowing additional activity based on a percentage of total catch rather than an absolute limit (as in the retained Article 13(b)) is inappropriate as it; (i) may result in significant cod catches where large volume fisheries catch cod as a bycatch and this results in significant removals, particularly where the cod stock is depleted; (ii) it offers a perverse incentive to catch more of other species in order to reduce the percentage catch of cod. If this derogation is to contribute to a reduction in exploitation of cod it is important that the total amount of cod caught by vessels under this does not contribute significantly to mortality. Therefore there is a need to have an overall cap on the catch of cod as a % of the TAC for cod taken by all vessels covered by this derogation. Such an approach would require monitoring of total catch, as with fully documented fisheries.



STECF EWG notes that there continues to be no requirement to evaluate the impact of this Article in terms of its contribution to total cod catches. Monitoring should be required as a condition for the derogation.

There are no further changes suggested to Article 13 by the Commission. However, the following points were noted by STECF EWG;

- i) Given the suggested introduction of Article 11a, which provides for a mechanism where effort *does not count* against a Member States uptake where fishing takes place with a gear approved by STECF to catch less than 1.5% cod, then Article 13(a) which allows *additional* effort for use of gears approved by STECF to catch less than 1% cod (high selective gears) becomes redundant and should be removed.
- ii) Given the suggested introduction of Article 11a, which provides for the definition of areas outside cod distribution where effort *does not count* against a Member States uptake, the retention of Article 13(d) which similarly allows for effort west of a defined area West of Scotland, which is considered outside of the cod stock distribution, becomes redundant as its provisions can be applied more flexibly in Article 11a. Therefore 13(d) should also be removed.
- iii) The difficulties in STECF providing advice on the evaluation of changes in partial F *expected* to be delivered by effort reductions as compared to the partial F reductions *considered* to be delivered by vessels taking part in cod avoidance activities under Article 13(c) were re-emphasised. It is considered that a better approach would be that STECF provides advice annually on the total catch (landings + discards) of cod that is expected to deliver the reductions in F implied under the cod management plan, and that monitoring (through fully documented fisheries or otherwise) ensures that catches remain under this limit. This approach provides a simpler and easier to understand approach, and it would be easier to verify compliance with the conditions of the derogation.

## **6.5 CATCH BASED CALCULATIONS FOR USE WHERE F REDUCTION MUST BE ESTIMATED (ARTICLE 13)**

A proposal which uses the same principles and approach as ICES fleet definitions (in terms of catch and discards) used by WGMIXFISH is given in Section 6.5.1. The general principle of calculations needed to determine catches associated with a defined reduction in F is described in section 6.5.2.

### **6.5.1 HOW TO MOVE FROM AN F-BASED TO A CATCH-BASED EVALUATION OF ARTICLE 13**

STECF has repeatedly underlined the difficulty for stakeholders to evaluate the compliance to Article 13 requirements, both for the stakeholders for whom the required data are particularly unclear, and for the STECF for whom no standardised evaluation method has been established. The main issue noted by STECF is that the plan stipulates that in order to be allowed to buy effort back, cod avoidance measures must be demonstrated to yield at least as much reduction in *Fishing mortality* than otherwise would result from effort reduction. This formulation raises a number of issues, and in particular the facts that 1) fishing mortality estimate is linked to the dynamics of the entire fishery, and therefore it is very difficult to monitor the beneficial effects of actions taken by only a subset of the fleet, 2) fishing mortality can only be monitored indirectly and ex-post through the use of an assessment model, and therefore the estimates are only available the year after the actions have taken place and 3) fishing mortality is a fairly

abstract concept that the industry cannot monitor and manage directly, and which doesn't have proportional relationship to catches.

Therefore, STECF (2011) argued that such F-based criteria should be replaced by more tangible and directly available criteria based on catches. The following text is a pragmatic recipe for performing a direct planning and evaluation of Article 13 for a given fleet  $Fl$ .

- It is understood that the TAC for next year ( $TAC_{y+1}$ ), expressed in tonnes, results from the 2 years projection of a stock assessment performed in the current year ( $y$ ), in order to achieve a given target  $F$  which itself is related to stock numbers at age. The linkage between  $TAC_{y+1}$  and the actual  $F_{y+1}$  that will happen next year is imperfect, as it is based on a number of assumptions on e.g. future recruitment, selectivity and growth. Therefore Article 13 cannot be evaluated on the basis of the true  $F_{y+1}$  for the TAC year as this one is not known yet, but only on the basis of the assumed (and thus known) projected  $F_{proj,y+1}$  which corresponds to the TAC. If the TAC is set according to the scientific advice, then  $F_{proj,y+1}$  is the same as used as the basis for advice. Otherwise, it is necessary to re-estimate the  $F$  from the TAC.
- Then it is necessary to know the quota share of the TAC for the fleet  $Fl$ . As the exact information on quota distribution is most often not readily available, a simple assumption could be to use the share of landings from that fleet to the total landings of the stock during the previous data year, as a proxy for the relative stability share of the nation where the fleet  $Fl$  belongs, plus the subsequent quota swaps and national quota distribution schemes. However, there is a risk of distortion and perverse incentives if the fleet has sold some of its quota. Therefore, it would be preferable that the fleet  $Fl$  would have the responsibility to document its actual quota share. This quota share is then assumed to be the projected landings that the fleet  $Fl$  will yield during the year ( $L_{y+1,Fl}$ ).
- Then it is necessary to estimate the discards for the fleet  $Fl$  ( $D_{y+1,Fl}$ ). As a basic principle, the best estimates of discards ratios to landings available, coming from the European Data Collection Framework and for the year  $y-1$  will be used ( $D_{y+1,Fl} = L_{y+1,Fl} * DR_{y-1,Fl}$ ), as it is understood that the scientific institutes may not have the resources for monitoring specifically the exact discard figures of the fleet  $Fl$ . As above, it is the responsibility of the fleet  $Fl$  to document if its discard estimates are different. An evident caveat is the assumption of stable discards patterns between the last data year ( $y-1$ ) and the TAC year, which can be violated in case of strong year classes entering the fishery. However, there is little way around this issue, and it is also the standard practice to use recent discards estimates in the short-term projection in single-stock advice. Alternatively, a longer-term average (3 to 5 years) can be preferred. It is considered preferable to match the method chosen to the approach in terms of years and ages used by ICES to advise on TAC options.
- Ideally, landings and discards estimates will need to be estimated by age. It is not desirable to proceed with bulk weight estimates, although it is of course possible (see also section 6.5.1).
- Once projected landings and discards (i.e. catches  $C_{y+1,Fl}$ ) estimates are known, it is possible to estimate a projected partial  $F$  from the fleet  $Fl$   $F_{proj,y+1,Fl} = F_{proj,y+1} * C_{y+1,Fl} / C_{y+1}$ . At this stage, the reduction target from the management plan can be translated into catch equivalent for the fleet  $Fl$ .

This catch reduction is therefore the target imposed on the fleet in order to obtain an Article 13 exemption for the TAC year.

This scheme could be applied appropriately for full buy back of effort or reduced buy back if required.

When the new assessment becomes available (typically during the mid-year of the current year), it might be possible to perform an update of the catch reduction target for the second semester, if the basis for F reduction has been revised.

Finally, at the end of the TAC year, an MS should carry out an evaluation of the actual achievement. MS are expected to collect sufficient data on the catch (discards and landings) to carry out and submit the necessary evaluation. If the fleet can be shown to have complied with the catch restriction, then this should be considered sufficient compliance. If insufficient data is collected to allow STECF to evaluate compliance, adjustments to the effort allocation would be expected.

#### 6.5.2 CALCULATING THE TOTAL IMPACT (IN TERMS OF TOTAL ALLOCATED FISHING MORTALITY) OF TAC ADVICE BY FLEET SEGMENT

This section deals with how to calculate the total impact (in terms of total allocated) of TAC advice by fleet segment. This will allow the total catch (landings + discards) that a fleet segment should keep within to be consistent with the F intended by the management plan.

In order to calculate a TAC, the management plan needs to apportion fishing mortality into appropriate components, and uses the component associated with landings in this calculation. Where fishing mortality is apportioned into allocated and unallocated mortality, and these estimates are provided from an assessment, the unallocated mortality is treated in the same manner as natural mortality in any calculations. At the stock level, the TAC formula would be as follows:

$$L = \sum_a \frac{w_a^L N_a l_a F_a^A}{F_a^A + F_a^U + M_a} (1 - e^{-F_a^A - F_a^U - M_a})$$

where  $a$  represents age,  $w_a^L$  the mean weight of landed fish,  $N_a$  the number of fish in the population,  $l_a$  the landing fraction,  $F_a^A$  the allocated fishing mortality,  $F_a^U$  the unallocated fishing mortality, and  $M_a$  the natural mortality.

The formula to break it down to fleet level (done at the level of age) is as follows:

$$L_{n,f,a} = \frac{w_a^L N_a \alpha_n \beta_{n,f} l_{n,f,a} F_a^A}{F_a^A + F_a^U + M_a} (1 - e^{-F_a^A - F_a^U - M_a})$$

where, in addition to the above,  $\alpha_n$  reflects relative stability (splitting quota by nation),  $\beta_{n,f}$  the split of the quota within a nation between fleet segments, and  $l_{n,f,a}$  the landing fraction within a nation and fleet.

The associated discards would then be:

$$D_{n,f,a} = \frac{w_a^D N_a \alpha_n \beta_{n,f} (1 - l_{n,f,a}) F_a^A}{F_a^A + F_a^U + M_a} (1 - e^{-F_a^A - F_a^U - M_a})$$

where, in addition to the above,  $w_a^D$  the mean weight of discarded fish

Given the above equations for landings and discards, discards can be expressed as a function of landings as follows:

$$D_{n,f,a} = \frac{(1 - l_{n,f,a}) L_{n,f,a} w_a^D}{l_{n,f,a} w_a^L}$$

This expression can be used to calculate the discards at age to be expected in any fleet segment that would be consistent with the fishing mortality intended by the TAC that has been set.

Caveats:

In the above formulation, the following simplification is made:  $W_{n,f,a}^L = W_a^L$  and  $W_{n,f,a}^D = W_a^D$ . This is thought to be a reasonable assumption. Other simplifications are possible (e.g. collapsing age), but would probably require sensitivity analyses before being judged acceptable.

## 6.6 PROPOSED CHANGES TO ARTICLE 14

Article 14 provides for the allocation of fishing effort by a Member State to vessels or groups of vessels within the gear groups ceiling in such a way that rewards “good fishing practices”, e.g. data collection enhancement, discard reduction, fuel efficiency etc..

The Commission have proposed two amendments to this Article;

Current text (1342/2008)	Proposed text
NEW	‘6. Where the scientific data indicate that more than [10 %] of the total cod catches for a particular effort group are attributed to discards, or where the quota allocation does not correspond to the expected catches and would likely result in cod discards, the Member State concerned shall take immediate measures to minimise cod discards.

STECF previously considered a suggestion from the Commission that an option for adjusting the implementation of Article 13(a) to overcome problems of low percentages leading to high absolute cod catches. In the case considered this was a secondary condition where there was a maximum 5% discard rate allowed of the cod catch in order to ensure that it did not lead to excessive cod catches. This new Article introduces a new requirement on Member States to take additional measures where discard rates are considered high for a particular gear group. However, whilst this is an improvement in that action by the MS is required this measure results in the same issues as highlighted in the STECF EWG 11-07 in that it i) leads to issues of discard estimation, and ii) permits continuation of discarding.

Currently proposals for CFP reform and management changes in general include a number of changes regarding a requirement to land all catches of cod and also some other species. Its not clear yet what the conditions and timescale of all these changes will be, however, it is likely that these measures will improve the situation regarding monitoring of catch and may give opportunities for improved compliance if implemented effectively.

Further, the implementation of the new Article 14.6 is problematic. A reallocation of quota is difficult in member states where relative stability / fixed allocation exists in some form also inside the country (e.g. Germany and Ireland...). The current draft could be interpreted in a way that quota could be reallocated towards fisheries with high cod bycatches. Fisheries that currently avoid bycatch of cod would need to give quota to fisheries with high cod bycatches. This would create perverse incentives by rewarding those with higher discard rates. Next to this it is not clear what exactly is -meant by 'discard'. Discard can be fish below minimum landings size or marketable fish. Under the current CFP only discard of marketable fish can be reduced by reallocating quotas in a sensible way. Under a discard ban this Article potentially becomes redundant.

Current text (1342/2008)	Proposed text
NEW	7. Member States shall establish and include in their national control action programmes, as prescribed in Article 46 of Regulation 1224/2009, systems to ensure compliance with the conditions referred to in Articles 11a, 11b and 13. Member States shall assign a 'very high risk' level to those vessels in their risk-based management as described in Article 5(3) of Regulation 1224/2209.'

It was considered that this addition was not within the remit of the group as it relates to control issues and allocation of resources within the competence of Member States, and therefore no comment is made.

## 7 REFERENCES

EC 2008 Council Regulation (EC) No 1342/2008 establishing a long-term plan for cod stocks and the fisheries exploiting those stocks

ICES 2012 Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK) ICES CM 2012/ACOM:13

STECF 2011 EWG report on the "Evaluation of multi-annual plans for cod in Irish Sea, Kattegat, North Sea, and West of Scotland (STECF-11-07)"

STECF 2012 39th Plenary meeting report of the Scientific, Technical and Economic Committee for Fisheries (PLEN-12-01), 16-20 April 2012

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## **9 LIST OF BACKGROUND DOCUMENTS**

Background documents are published on the meeting's web site on:  
List of background documents:

1. EWG-12-07 – Doc 1 - Declarations of invited and JRC experts.

## The North Sea Regional Advisory Council



### Contribution from the NSRAC to the STECF Meeting 18<sup>th</sup>-22<sup>nd</sup> June 2012 Edinburgh

**June 2012**

#### 1 Introduction and Background

- 1.1 This position paper is the North Sea RAC contribution to the STECF Expert Working Group (EWG 12-07) on Multi-Annual Management Plans that will meet in Edinburgh on 18<sup>th</sup> -22<sup>nd</sup> June 2012. The paper builds on earlier advice presented as part of the ICES/STECF evaluation on the EU Cod Management Plan (EC 1342/2088).

#### 2. Long Term Management Plans

- 2.1 The NSRAC agrees that setting long term objectives and moving progressively towards them has been an important and positive step forward in the management of North Sea demersal stocks. This move away from *ad hoc* decisions on TACs and other measures has provided a greater degree of stability and coherence. However, there is some considerable way to go before we will have moved the full distance from the limited set of harvest control rules from the EU Norway negotiation process, to the comprehensive, participative, and well considered management plans that we all aspire to.
- 2.2 The NSRAC has been preparing advice on LTMPs since 2005 and has produced draft advice for the North Sea *Nephrops* fishery that is still under discussion. This work, of value in itself, also provides an indication of the range of biological, socio-economic, ecosystem and fisheries management issues that should be addressed in developing a comprehensive management plan with a high degree of stakeholder involvement.
- 2.3 Our perception is that within the CFP generally, and within the two plans aimed at rebuilding the cod stocks within the cod recovery zone (EC 1342/2008 and EC

423/2004), there has been overemphasis on targets at the expense of delivery and implementation mechanisms. The “fisheries response” to management measures is critical, yet has not been accorded sufficient attention. The result of all the actions so far by the Commission, as spelt out in previous NSRAC advice has been a series of uncoordinated and sometimes inconsistent and contradictory measures that have largely failed to achieve their objectives, or have done so in a way that has generated unacceptable collateral damage.

- 2.4 The North Sea fisheries are multi-faceted, multi-species, multi-gear and multi jurisdiction. As a consequence, stakeholder involvement is imperative for the effective design, development and the implementation stages of all long term management plans.

### 3. Fishing Mortality

- 3.1 ICES advice for cod in 2011 indicated that:

- There has been a gradual improvement in the status of the cod stock in the North Sea in recent years
- Fishing mortality declined from 2000 but is well above FMSY and is just above FPA
- Spawning Stock Biomass has increased from an historic low in 2006 but remains below BLIM
- Recruitment since 2000 has been poor possibly due to the influence of food supply for cod
- Although discards are still high there has been a decreasing trend since 2008

- 3.2 The STECF evaluation of the EU Cod Plan concluded that the rate of decline in fishing mortality on cod has been shallower under the Cod Management Plan in comparison with the Cod Recovery Plan, despite the progressive and large annual reductions in fishing effort required under the former. Although it is difficult to differentiate between the effects of different management measures it seems likely that the reduction in capacity of the fleets fishing for demersal stocks in the North Sea during 2003-2007 was a significant factor in reducing fishing mortality.

- 3.3 A major source of mortality remains the discarding of cod. Following the introduction of various landing controls, cod landings are now fully recorded. The focus of management and stock rebuilding efforts must necessarily fall on reducing the unwanted mortality associated with discards of cod in the various North Sea demersal fisheries.

### 4 Effort and Fishing Mortality

- 4.1 Notwithstanding the above, it is fair to say that there remain uncertainties in the present ICES estimates of fishing mortality. The relative contributions of discards, landings, unaccounted removals, seal predation and recreational fishing are especially uncertain.

- 4.2 Similarly, the apparently weak link between reductions in fishing effort and fishing mortality, identified by STECF in its evaluation, raises an important question over the role that effort control can play, given the difficulties in implementing those controls. Effort control has also been overlaid over a system of TAC constraints. The NSRAC has spelled out in its earlier advice why it considers that effort control has been an obstacle to rapid rebuilding of the cod stocks rather than providing a positive contribution. The role of exemptions from the effort regime as an incentive to various kinds of cod avoidance is unarguable but we ask whether this could be replaced by other forms of incentive, notably the transfer of fish resources from the ICES discards column to the landings column in return for commitments to specific cod avoidance/discard reduction measures.

## 5 Discards

- 5.1 Reducing discards of cod and thereby reducing unwanted fishing mortality on cod should be taken into account in the formulation of any new multi-annual plan. The provisions in Article 13 of the EU Cod Management Plan for tailored, incentivised cod avoidance and discard reduction provided a ground breaking development that opened the way for a number of successful initiatives. These included real time closures, Catch Quota trials and various kinds of gear selectivity. Discussion of 'Fully Documented Fisheries', in which the whole catch is recorded and verified, should be promoted and considered as an opportunity for delivering different incentives linked to effective cod avoidance/discard reduction initiatives. Debate should not simply be limited to a discussion of the introduction of CCTV cameras on board vessels.

## 6 Multi-species aspects

- 6.1 Although ICES work on the provision of advice based on multi-species assessments in mixed fisheries for North Sea demersal stocks is still at an early stage it is appropriate for the NSRAC to make the following observations:
- Multi-species interactions are likely to be significant within mixed fisheries
  - Trade-offs between the interests of different fisheries will be necessary to arrive at balanced harvest control rules
  - We are managing fisheries within a dynamic stock and fisheries context where it cannot be assumed that conditions next year or the year after will be the same as last year.
  - The 'fisheries response' to management measures is likely to be a pivotal factor and this is likely to be driven primarily by economic considerations. Fisheries cannot adapt every year to changing circumstances.
  - Multi-species interactions require political decisions before management can be carried out. Whether the target is to maximize fish biomass, economic value or social benefits (jobs) has to be defined. Extensive stakeholder consultation will

be necessary before a multi-species-plan for a region can replace multiple single-stock-MSY based plans.

## 7 MSY in Mixed Fisheries

- 7.1 NSRAC work is in progress on multi-species and mixed fishery dimensions of multiannual management plans. We are acutely aware however that the concept of MSY has limited relevance to multi-species and multi-gear fisheries beyond an overall aspiration to deliver high long-term sustainable stocks and yields whilst providing adequate protection for vulnerable stocks and species.
- 7.2 What is clear is that although many demersal North sea stocks are already in the region of MSY (understood as a range rather than a precise point on the effort/yield curve) managers require a pragmatic and flexible framework that encourages movement in the right direction rather than a rigid and prescriptive set of harvest control rules.

## 8 Multi-Gear Dimensions

- 8.1 We would draw attention, within the context of demersal stocks in the North Sea, to the significance of 'economic driver' species that to a large degree determine vessels' fishing patterns and behaviours: Some of the more important driver species in addition to cod are, for example:

Anglerfish/megrim  
Sole  
Plaice  
Nephrops  
Saithe  
Haddock  
Whiting  
Lemon Sole

- 8.2 An effective approach to management measures must move away from blanket measures that rely on an assumption that all parts of the fleet respond to management measures in a uniform way. In practice, even those parts of the demersal fleet that catch varying quantities of cod are driven by different considerations - largely related to their economic driver species.

## 9. Necessary Features of a Long Term Management Plan

- 9.1 On the basis of our experience of the EU Cod Recovery Plan (2004-07) and the EU Cod Management Plan (2008 – present) it is possible to draw up an inventory of the features that we consider important for inclusion in a new plan (or plans) for North Sea demersal stocks. The plans in our view should:

- Be developed and implemented within a participatory framework which allows fisheries managers, scientists and fisheries stakeholders to work together to develop objectives, timeframes and measures and to cooperate closely on the implementation and delivery of the provisions of the plans.
- Have a regional seas focus, reflecting the specific characteristics of the fleets, ecosystems and fisheries dynamics in an area like the North Sea. There are different stock dynamics in the North Sea, West of Scotland and Irish Sea and different fleet characteristics. We are open to discussion on the parameters of the North Sea area and whether sub areas within the North Sea should be used for zoning or differential management measures.
- Management measures should be tailored to the specifics of the fisheries. For example, it is evident that a different management approach is needed when cod are recovering, and appearing in catches in greater numbers, than when the stock is in decline.
- Focus on discard reduction, as this is likely to deliver the largest returns in terms of reducing overall fishing mortality.
- Focus management measures on outcomes rather than overly prescriptive detailed legislation, as stakeholders can agree on the delivery of targets at regional/fisheries level.
- Ensure that all catches are registered for the main economic driver species.
- As far as possible, align economic incentives within the fishery with the objectives of the Plan.
- Be adaptive: obvious deficiencies in the plan should be addressed rapidly through flexible review arrangements, without undermining overall commitment to the plan objectives.
- Move away from blunt measures such as effort control, towards tailored avoidance and discard reduction measures.
- Develop a toolbox approach that allows scope for member states and fishing vessels to select the best means of achieving the plan's objectives.
- Minimise conflicts inconsistencies and perverse effects arising from overlapping management plans; in particular remove measures that result in reduced selectivity.
- Recognise that by-catch can embrace both discards (undesirable mortality) and/or a catch of a valuable subsidiary species. It is discards that need to be reduced (as a source of undesirable mortality), not by-catch per se.
- Be aligned with the main direction of CFP reforms and in particular: regionalisation, discard reduction, and the integration of fisheries and environmental objectives; the potential role for member states and the RACs (ACS) to work together on multi-annual management plans on a regional basis should be taken into account as should the necessity to integrate Norwegian stakeholders into the dialogue on the content of the plan(s).
- Strike an appropriate balance between delivering healthy stocks with high, sustainable, long term yields for the main commercial species with providing targeted and appropriate protection for vulnerable stocks and species.
- Take practicable steps towards an ecosystem and multi-species approach, recognising that as yet both are poorly defined.
- Avoid constraining fisheries and fishing activities that catch minimal quantities of the species being managed.

## 10 Interim Regime

10.1 NSRAC priorities for the interim period pending agreement on a new comprehensive Multi-Annual Plan for cod, to be agreed through co-decision, are as follows:

- A pause or freeze on effort controls
- Measures tailored to the characteristics of the fisheries concerned, the conservation status of the stocks, the quality of the scientific assessments and the stock dynamics. The Cod Management Plan suffers from being a blanket, top-down approach. A differentiated approach would be more successful. The West of Scotland and Irish Sea are clearly different from the North Sea.
- A simpler and clearer route for groups of vessels seeking exemption from the effort regime
- Freeing up those fleet sectors that have become victims of the plan. Sectors that do not target cod and have very low annual by catches of cod, but where effort levels are cut as a result of perverse incentives
- Progress begun under the buyback/cod avoidance/discard reduction provisions are promising and should be encouraged and developed
- In the North Sea a focus on discard reduction is likely to be the most immediate and effective means to reduce unwanted cod mortality
- We support management measures to improve cod and other stocks but recognise that there is no guarantee that any management measures will necessarily be successful against a background of high levels of natural mortality and major change in environmental conditions.
- In some cases improvements to the cod recovery regime could be brought about through improvements to the procedures rather than the legal text, with protocols indicating clearly what is required of the member states, STECF and the industry.

## **ANNEX II POSITION PAPER FROM NORTH WESTERN WATERS RAC**













### Background

The evaluation of multi-annual plans for cod in Kattegat, North Sea, Irish Sea and West of Scotland carried out by STECF in July 2011 indicated that landings quotas and effort were unlikely to deliver the objectives of the plans over the next few years. A number of issues were identified, in particular that landings quotas were unable to constrain catches of cod in these areas and that overall effort restrictions were having impacts well beyond the cod fisheries without yet delivering reductions in cod mortality.

The STECF group that is reviewing the past performance and preparing options for the European Commission for the future is considering a range of management options. This working paper ranks the management options based on expected compliance and their effect on enforcement.

### Management measures suggested by the STECF

The candidate management measures suggested by the STECF for the NS included the following:

1. *The current plan*: Continued use of the basis of the current plan (landings TACs, effort control with derogations) but with simplified and more consistent derogations for fleets reducing cod catch.
2. *Mixed fishery landings quotas*: Mixed fishery landings quotas matched across species.
3. *Mixed fishery catch quotas*: Mixed fishery catch quotas matched across species with in year increases if catches of cod kept below limits.
4. *Individual vessel/business catch quotas*: A system of individual vessel/business catch quotas set at single species level but tie up once any quota is exhausted.
5. *Real time effort incentives*: Effort based real time incentives (RTI) based on spatial effort allocations where effort is expended at different rates for more critical areas

For candidate measures 2-5 the options would involve:

- Setting of mixed-fishery TACs for fisheries at the European level – agreed by Member States. These would be TACs for individual stocks which are set in a way that accounts for the fact that the different stocks are caught together in mixed-fisheries.
- Operation/implementation for landings or catches at or below the target at Regional/MS level.
- Where catches are to be controlled, fishermen must agree to that it is their responsibility to show that they are catching under the limits.
- As a general principle non-compliance must carry sufficiently appropriate ‘penalties’.
  - This may involve specific contracts between licensees and MS authorities
  - Minor over-catch that is declared should be dealt with by banking and borrowing (i.e. max 10 %) for vessels between years at MS level, and not considered an offence. This also requires that borrowing/banking is permitted between the MS and the EU.
  - Non-compliance that does not result in excess/inappropriate catch could be dealt with initially by low penalties, which would be raised for repeated offences.
  - Non-compliance which results in significant false/under declaration of catch should have penalties set taking the probability of detection into consideration as well as the potential financial gain detected, including removal of future fishing opportunities.
  - Excessive penalties would be unfair and unreasonable but failure to have sufficiently stringent penalties will incentivize non-compliance.

## Method for analysis

Each of the five management options was broken down into management components which were then evaluated from an 'enforcement' perspective using the following criteria. For example, when looking at option 1 (Continued use of the current plan) the following management measures were addressed:

- Landings quotas
- Effort limitations
- Individual fishing opportunities (to reward business that undershoots catches etc.)
- "Borrowing/Banking" (MS to Commission and within MS between years)
- Technical measures

The below enforcement questions were addressed for each of the management components:

- *Controllability* - is the management measure possible to control?
- *Enforcement tools* - how shall the management measure be controlled?
- *Cost-effectiveness* - Is the control measure cost effective?
- *Compliance* - What are the requirements for compliance to the management measure?
- *Infringement* - What are the types of infringements that can occur in relation to the management measure?
- *Obstacles* - Are there any obstacles faced by fisherman in terms of compliance with the management measure?
- *Incentives* - Can incentives for compliance be created?

Many of the management components are repeated in more than one of the management measures. In the end eight management components were identified and included in the analysis:

- Landing quotas
- Catch quota management (CQM)
- Effort limitations
- Individual fishing opportunities
- "Borrowing/Banking" (MS to KOM and between vessels in MS)
- Technical measures
- Discard ban vs. fully documented fisheries
- Mixed fisheries landings quotas
- Mixed fishery catch quotas

## Ranking of management measures

Looking at the five management measures suggested by the STECF it is evident that management measure 2 and 3 are parts of measure 1, 4 or 5.

Option 1 (continued use of the current plan) has the benefit of already being in place, i.e. systems have been put in place and the industry and authorities have adapted to the change. However, from enforcement point of view the fewer elements the system contains the less will the enforcement resources be dispersed. To include two controlling mechanisms such as landings quotas and effort is therefore not favoured.

Option 5 (effort based RTIs) has not been considered due to uncertainty of how effort is translated into quotas and vice versa.

Option 4 (Individual vessel/business catch quotas set at single species level but tied up once any quota is exhausted) is the preferred management measure when enforcement and incentives for compliance is considered.

The management components of management option 4 as suggested by STECF and some added management options are analysed below. The measures include the following management components:

1. Catch quota management (CQM) and fully documented fisheries (FDF)
2. Individual vessel/business catch quotas
3. Time and area measures

## **Results**

For each of the management components of management option 4 the enforcement questions stated above are addressed.

### **1.Catch quota management (CQM) and fully documented fisheries (FDF)**

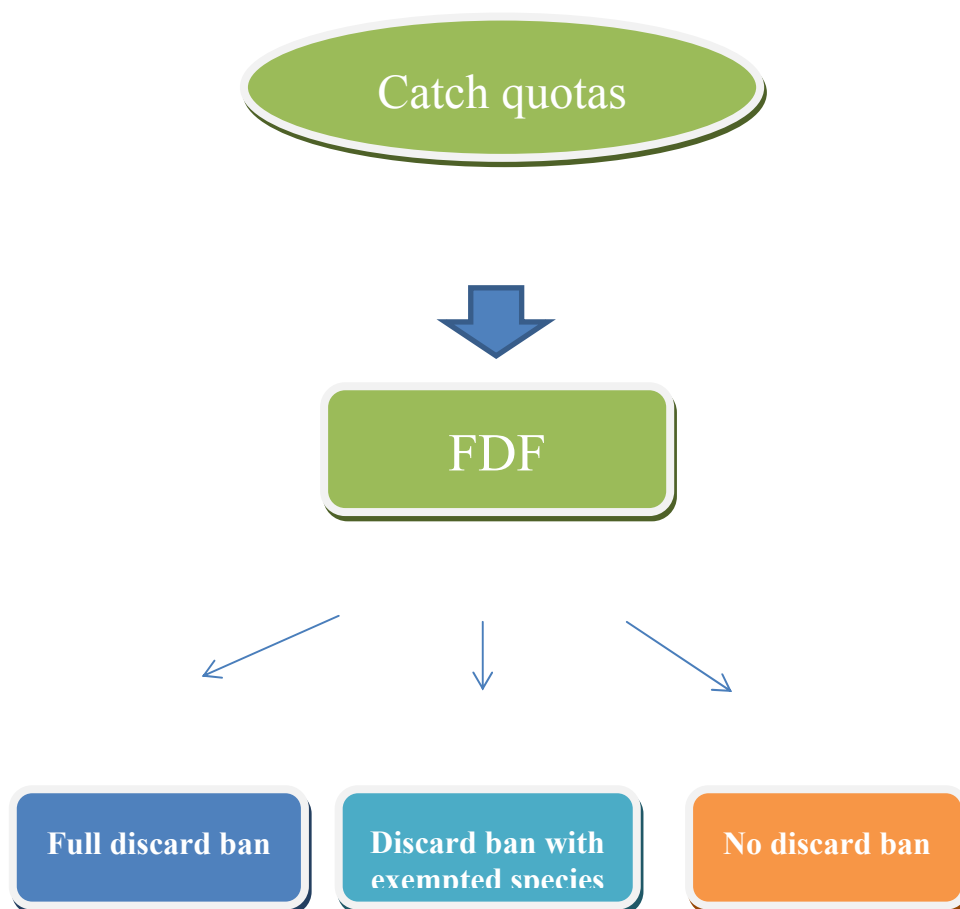
In the catch quota management scheme all catches are deducted from the vessel quota. When the vessel quota is exhausted the vessel has to cease fishing in the area.

The enforcement problem consists of ensuring that the fisher fully document the extraction from the resource, i.e. that all catches are being reported in the logbook as either landings or discards (FDF). Whether the catch is being discarded or not, in itself, makes no difference as long as the quality and reliability of the recorded catch composition can be ensured. However, the cost and efficiency of the enforcement tools used to enforce the management system will vary depending on whether or not discarding is regulated.

#### *Controllability, cost-effectiveness and infringements*

The CQM and FDF can be regulated in combination with a full discard ban, a discard ban with exempted species and without a discard ban but where catches and discards are reported in the logbook. The table below illustrates the effect on enforcement and compliance of these options:





1  
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<b>Verification needed</b>	That no catch is discarded.	That no catch of included species is discarded (possibly by species and quantity).	Quantity and species discarded.
		Quantity and species discarded of exempted species.	
<b>Reporting</b>	Logbook = catch Landings declaration = catch	Logbook = catch + discards Landings declaration = catch – allowed discards	Logbook = catch + discards Landings declaration = catch - discards
<b>Infringement</b>	Discard ban	Discard ban and misreporting	Misreporting

Confidence in	1	2*	3
catch levels			
(1 highest)			
Cost	3	2*	1
(1 highest)			

*\* If exempted species are only present in some fisheries and/or are very different in size etc. from other catch, controllability is improved.*

All options are difficult to enforce but as the table illustrates, a full discard ban is clearly superior to the other alternatives from an enforcement perspective. In addition to achieving the greatest confidence in catch levels it is also the least difficult as well as the most cost-effective option to enforce.

### *Enforcement tools*

Controlling a FDF system in combination with any of the options for regulating discarding practices requires monitoring of the fishing activity at sea where the discarding takes place. There are four enforcement tools that allow for that; on board observers, patrol vessels, aircraft and CCTV-systems (sensors, GPS, cameras). Other enforcement tools such as landings and administrative controls can be used to identify irregularities in the length and catch composition that indicates that discarding has taken place.

CCTV-systems can provide coverage of the entire fishing activities for a fraction of the cost of other enforcement tools at sea. For this reason it is a superior tool from an enforcement perspective while also providing highly useful information on the fishing activity through electronic sensor and GPS<sup>55</sup> data.

As is the case for most enforcement tools the CCTV systems should be implemented and applied based on risk analysis. For example, time spent on analysing footage could differ depending on the whether the vessel is operating in risk areas etc.

The design of a CCTV-system must consider personal integrity aspects.

### *Obstacles*

In a CQM that includes a discard ban the fishermen could face problems to store fish, as well as handling of by-catch on board and at shore. These issues should be addressed and solves as far as possible before the introduction of the management system.

### *Incentives*

Higher precision of catch data should allow the authorities to decrease buffers to hedge for uncertainty in catch estimations which in turn can lead to higher quotas. Another incentive of using the system could be to grant CCTV vessels access to some closed areas and to be exempted from certain landings obligations.

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<sup>55</sup> can provide geographical position every 10 seconds

In a CCTV system the quality and amount of fisheries data that is available for the authorities will increase drastically. It is therefore of outmost importance that a review of all management measures that the fisher is operating under is carried so that redundant measures can be removed.

Operating under a CCTV system could potentially improve the acceptance of fishing practice among the public which in turn potentially can increase the demand for fisheries products.

#### *Compliance*

The CCTV-system would improve compliance of reporting rules as well as any potential discard ban. However, a system of CQM with some type of discard ban cannot be successful if the right surrounding measures are not in place. Systems for receiving undersized or unwanted catch in harbours, rules of conducts etc. has to be developed so that compliance is not hindered.

If only part of the fleet is equipped with CCTV, a sense of unfairness that potentially could influence compliance, could be created. This has to be considered alongside the benefits of equipping only parts of the fleet based on a risk based approach.

## **2. Individual vessel/business catch quotas**

An allocation of quotas to the individual vessel/business level allows the fishermen to fully bear the benefits of complying with the rules as well as directly bear the cost of any illegal activity. Vessels must cease to operate when first quota is exhausted.

#### *Controllability, enforcement tools, infringements and cost-efficiency*

The enforcement problem consists of ensuring that the catch is reported accurately and counted in the quotas. By introducing a FDF-system that is primarily controlled by a CCTV-system in combination with other enforcement tools such as landings control, this can be achieved.

From an enforcement perspective individual quotas are preferred over collective quotas since it allows the fishermen to fully bear the benefits of complying with the rules as well as directly bearing the cost of any illegal activity.

#### *Compliance*

The initial allocation of quotas is an important key to achieve compliance. In fisheries with a large overcapacity the initial allocation is difficult. Furthermore, the allocation of choke species in fisheries where the national quota of the species is very small, due to the relative stability, is difficult.

The system could allow for possibilities to cover unexpected catch after the fishing trip by buying or renting. This is necessary to provide flexibility for the fishers but adds to some extent to the control burden of authorities. This system requires flexibility between the MS and the EU in a system of borrowing and saving between years.

#### *Incentives*

The risk of withdrawal of the individual fishing quota with all the economic consequences that means for the fisherman should be a strong incentive for compliance. This does of course require a legal system that allow for that type of legal action.

#### *Obstacles*

Choke species that cannot be obtained on the market due to a too small or no national allocation in relation to the abundance of the fish could hinder compliance. This is a problem of relative stability which is not addressed here.

### **3. Gear, area and time measures**

To limit discarding the technical measures in place have to support and allow for a selective fishery.

#### *Controllability, enforcement tools and cost efficiency*

In the North Sea these measures have the benefit of already being in place, i.e. systems have been put in place and the industry and authorities have adapted to the change.

Controls on area and time measures (e.g. seasonal and/or areas closures) are to a large extent carried out at sea using patrol vessels and aircraft. Other tools used are VMS and GPS systems to track where the fishing activity takes place.

Time or area closures, without exception, are preferred to technical regulations since it makes control at sea easier and more cost-effective. In general limiting regulations such as ‘one net’ rules and fishing in specific limited areas per trip ease the control burden.

#### *Compliance*

The usage of certain gears might not be economically optimal which might drive non-compliance.

#### *Obstacles*

In the case of area and time measures the measure could create obstacles for the fisheries if transiting over large areas are necessary.

#### *Incentives*

One way of providing incentives for selective fishing could be to reward additional quotas for the usage of certain gears.

### **Concluding remarks on enforcement**

From an enforcement perspective a slightly modified version of the individual vessel/business option should be implemented for the NS. The management option includes primarily a catch quota management (CQM) system in which the quotas are allocated to the individual fisherman or business. The accuracy of the reported catch is ensured by CCTV systems within the framework of a fully documented fishery (FDF).

In order for the management option to achieve its objectives it is important that the effect on compliance and enforcement of the entire system of management measures is considered. From this perspective it is crucial that the control measures:

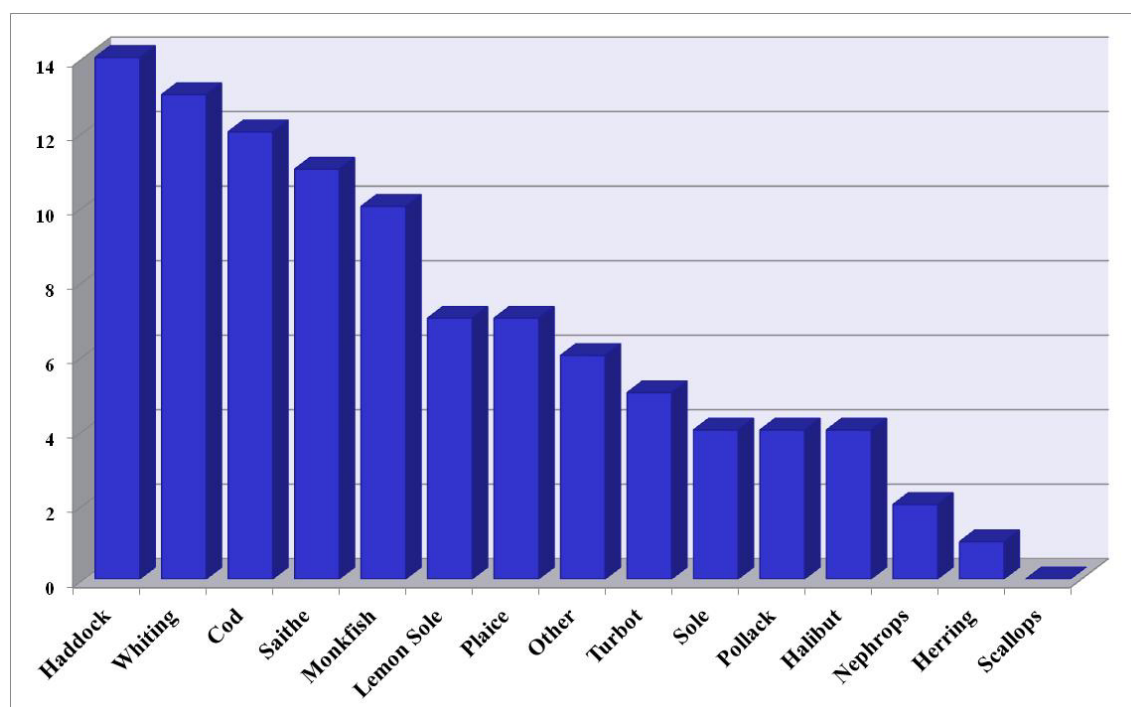
- are harmonized over regions and MS as far as possible to avoid actual or perceived unfairness.
- are kept to a minimum to avoid spreading limited control funds over a large number of measures.
- ensure that the fishers receive the benefits of complying with the rules as well as the bearing the costs of non-compliance.
- carry appropriate penalties for non-compliance; failure to have sufficiently stringent penalties could incentivize non-compliance.
- consider incentives for fishers to comply with the rules.
- are stable over time (as far as possible) to avoid confusion and mistakes.
- are understood and accepted by the industry
- are applied in the most cost- efficient way using the appropriate tools and intensity to control each management option.

## ANNEX IV SURVEY OF MANAGEMENT OPTIONS – VIEWS OF VESSEL OWNERS/OPERATORS

**John Powell, CCRI.**

An on-line questionnaire was developed to explore views of vessel owners/operators to four different management options. The survey was conducted during May 2012 using Bristol On-line software, but only 19 useable responses were received. Of these all respondents operate in the North Sea, 4 in the West of Scotland, 2 in Eastern Channel, and 4 in other areas. A total of 12 respondents were targeting Cod, and other key species include haddock, saithe, whiting, and monkfish.

**Figure 1: Species targeted by respondents**



The management approaches were described as follows:

Management Approach 1:

- Continue the current management plan (landing TACs, effort controls)
- Simplified derogations for fleets reducing cod catch

Management approach 2:

- Mixed fishery catch quotas reduced to match across species
- In-year increases if Cod catches are kept below limits

#### Management Approach 3:

- Individual vessel/business catch quotas set at single species level
- Vessel must tie up once any single quota is exhausted

#### Management Approach 4:

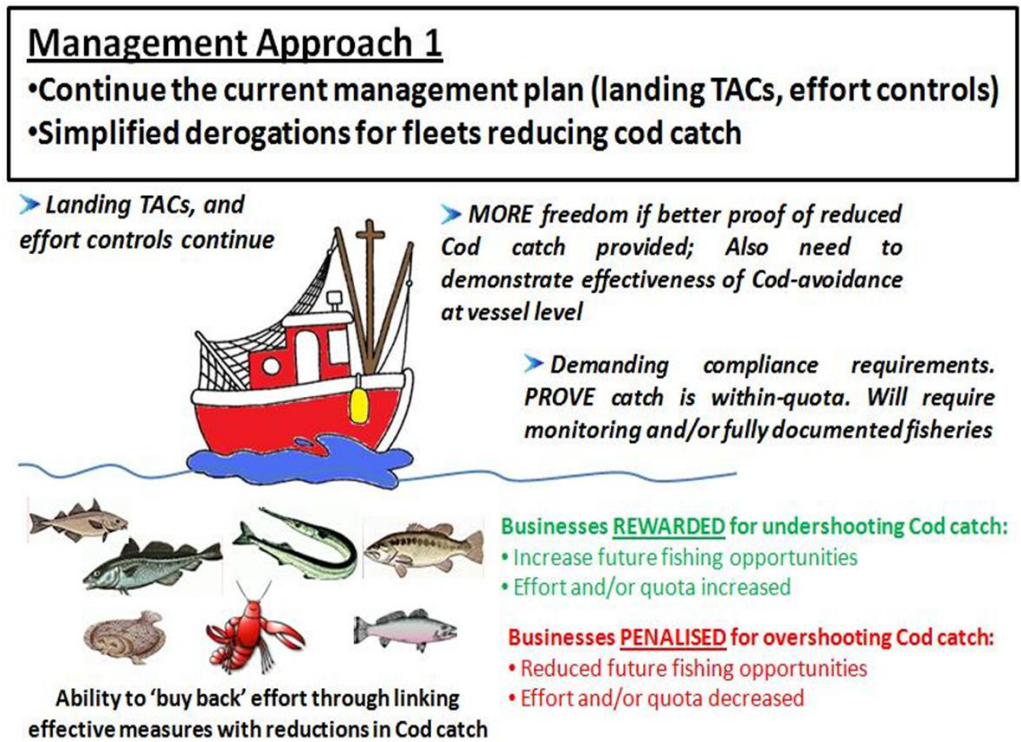
- Effort based real-time incentives
- Each vessel allocated 'fishing credits'

Each approach was explained more fully in the questionnaire using a sketch of a fishing boat and short summaries highlighting key aspects of the proposed management regime. Each management approach was described using the bare minimum of information to get across the main aspects of the approach. One example is illustrated below in Figure 1 (for Option 1). The same set of questions was asked about each management approach in turn to obtain respondent views on whether the approach would be more difficult, no different, or easier than the current situation for the following activities:

- Managing my fishing effort
- Controlling costs
- Managing my Cod quota
- Managing my quota for other species
- Reducing discards of Cod
- Reducing discards of other species
- Using my knowledge and judgement about when and where to fish
- Fish safely
- Adapting my effort to the weather and other environmental conditions

Respondents were also asked to indicate potential financial impacts (i.e. changes in annual income, profit, input costs (fuel, supplies, new gear, repairs), and number and type of crew employed), and provide an indication of how difficult they felt it would be to enforce the approach.

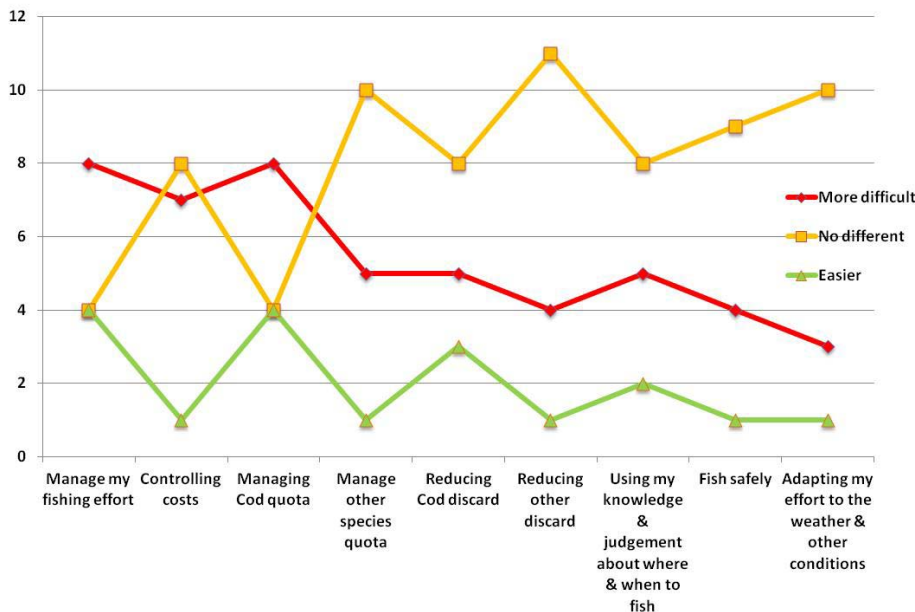
Figure 2: Presentation of Option 1 in the questionnaire



### Results

The impacts of Option 1 were viewed as not having much impact from the current situation. The majority of respondents indicated no difference to their activities, although 8 respondents indicated it would have a negative impact on managing fishing effort and managing their Cod quota.

Figure 3: Impacts of proposed management Option 1



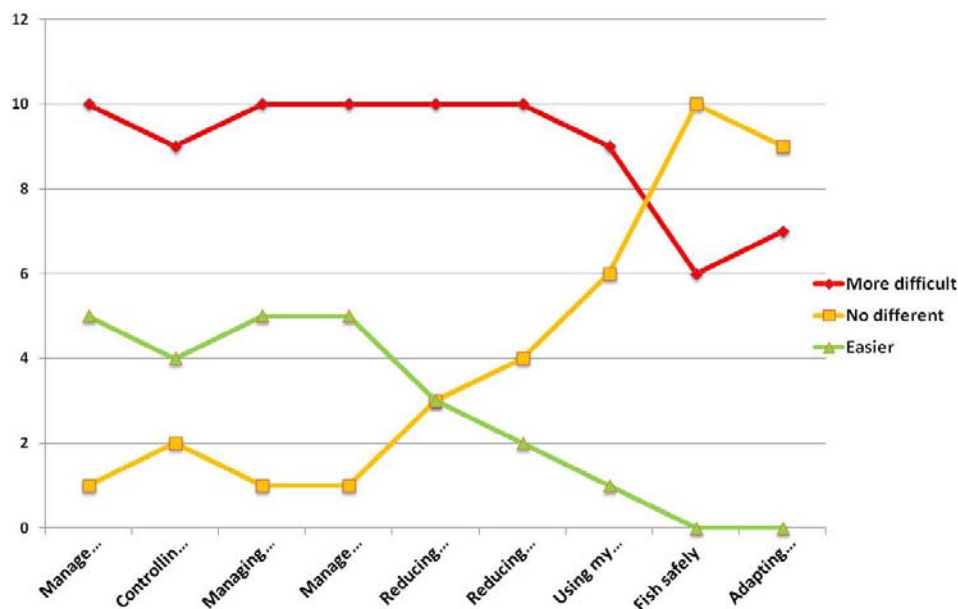


Option 3 (Individual vessel/business catch quotas set at single species level; vessel must tie up once any single quota is exhausted) was viewed as the least favourable approach. More than half of respondents indicated that under this option the following activities would be more difficult:

- Managing my fishing effort
- Managing my Cod quota
- Managing my quota for other species
- Reducing discards of Cod
- Reducing discards of other species

In addition more than half of all respondents indicated fishing safely and adapting to weather and conditions would be no different. More than half of respondents indicated the approach would have a negative impact on annual income and profit. Five respondents indicated that managing effort, cod quota and cod discards would be easier, and four indicated a positive impact on annual income from fishing activities.

**Figure 4: Impacts of Option 3**



When asked for specific opinions on the approach the focus of respondents was on the impact of the quota issue on their activities. Problems identified included:

- “I cannot take all my quota”
- “Will not work because the small quota on Whiting would stop you fishing within weeks”
- “Unworkable – impossible to stop fishing when one species is caught”
- “Lack of Cod quota and the cost of renting quota”
- “Most would be forced to sell up or go bankrupt”
- “Lack of quota for certain species - Hake and Coley”
- “Unworkable - impossible to stop fishing when one species caught”

“Cannot stop fishing when one species is caught”

Respondents also indicated that the perceived abundance of Cod caused problems in terms of meeting or exceeding their quotas.

“It’s impossible to fish and avoid Cod due to their abundance”

“There has always been a dominant species, - trying to regulate the fishery on one species will always result in abuse and discards of the dominant species”

When asked about benefits of the approach respondents also focused on the quota issue:

“Vessels with high quota will be able to fish as they should those that have no quota will have to stop fishing sooner”

“Reducing discards and getting extra quota in long term will reduce leasing costs”

“Vessels that have quota will be able to fish as they should be , those that have no quota and most of the discards will have to stop fishing sooner”

The views provided by the respondents suggests that those who had adequate quota would be better off under this management approach, but those with low quota would suffer, because as soon as their quota for a species was used up they would have to tie up. The nature of the on-line questionnaire suggests that some of the respondents picked up on this particular aspect of the proposed approach and it strongly influenced their opinion.

What is interesting from the responses received is the level of support for particular implementation techniques. There appears to be general support for activities such as banking and borrowing from one year to the next, and for CCTV. Examples of responses include:

“CCTV is very good on reducing Cod discards and making the skipper think where to fish and with what size”

“Reducing discards and getting extra quota in the long term will reduce leasing costs. In favour of expanding CCTV to certain boats/species”

“Banking and borrowing with a 15% limit”

“Banking and borrowing is a good idea”

In terms of ease of enforcement the majority of respondents felt that Option 1 (closest to the current situation) would be easiest to enforce, and Option 2 the most difficult. Respondents were equally divided over the ease with which Options 3 and 4 could be implemented with half thinking they would be easier and half thinking they would be more difficult.

**Table 1: Perception of impacts on activities**

Activity	Harder	No different/easier
Fishing effort	> Half say 3 and 4 is harder	25% say all Options are easier
Controlling costs	Options 2 and 3 appear more negative	Option 4 has fewer negative responses
Controlling quota	For Cod 2 & 3 appears more negative	Option 1 appears easiest for other species
Reducing discards	For Cod and other species Options 2&3 appear more negative	For Cod and other species Option 1 no different
Using my knowledge	Options 2 & 3 more negative	
Fishing safely		Majority saying no difference under all Options
Adapting effort to controls	Option 3 has most negative responses	Majority saying no difference under all Options

## Summary

The views of fishermen are based on a very small sample, and the management options presented range from the known and familiar (Option 1) to the unfamiliar (Option 4), which would undoubtedly influence perceptions. Option 4 (real time incentives), which is the least familiar is the most difficult to interpret with no clear set of views emerging. This might be due to lack of familiarity with the ideas presented. Option 3 is the least preferred and appears to have the highest perceived negative financial impacts.

A major focus of respondents throughout all management approaches was on quota and a perception of relative Cod abundance. Respondents with enough quota suggest that Options 2 and 3 would be less damaging than those with limited quota, who see option 3 in particular as restricting their fishing opportunities. The main negative impacts for Options 2, and 3 apply to the following activities:

- Managing my fishing effort
- Controlling costs
- Managing my Cod quota
- Managing my quota for other species
- Reducing discards of Cod

Activities least impact by the proposed measures relate to:

- Using my knowledge and judgement about when and where to fish
- Fish safely
- Adapting my effort to the weather and other environmental conditions

There is support for implementation actions such as CCTV and banking/borrowing from one year to the next.



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## Abstract

The STECF Expert Working Group (EWG 12-07) on Management plans part 2 met in Edinburgh, Scotland from 18 to 22 of June 2012. The meeting provided two reports, one on Area and modelling options (STECF- 12-14) and this report considers management aspects relating to the revision of cod management plans.

The EWG considered evaluation of a range of management approaches from compliance and industry perspectives. The studies are preliminary but indicate rather divergent views on the best solutions. In the review of the proposed changes to the cod plan changes to Articles 9,11,12,13 and 14 are discussed.

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